



313



Cardamom

29.

Food Science & Technology
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JANUARY - FEBRUARY 1979

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CARDAMOM

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Cardamom Industry in India

Vol. II

JANUARY-FEBRUARY 1979

No. I

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ON THE COVER

Mr. Alexey Kosygin, Prime Minister of U. S. S. R. being garlanded by Shri N. G. Panickar of M/s. Produce & Spices Marketing Co., Bombay at Indian Exhibition, Moscow on 30th Aug. 1978

TOWARDS GREENER BOLDER CAPSULES

The recent Market Survey conducted by the Board in the Middle East and West European countries has brought to the attention of the various interests in the cardamom plantation industry the fact that there is still great demand for bolder and greener cardamom. High quality grades of cardamom, i. e. AGEB, AGB and its equivalents still continue to have its sway over our principal buyers in the Middle East. About half of the world demand for cardamom is for these top quality grades which accounts for about 30% of world production. Side by side with this demand there has been substantial increase in the price which has brought with it tremendous changes in the out-look of the planter. He is now in a position to go in for better technology with regard to various cultural operations.

If we cast a glance at the world production and consumption figures it can be seen that only over 65% of total demand is being met in the existing supply situation. This demands a co-ordinated effort to increase production. It is in this context that plant protection measures have come to gain more relevance.

The yielding capacity of a crop is a function of the plant and its environment. For doubling the crop a first hand knowledge of the nutrient requirements of the plant, environmental factors that contribute to plant growth etc. is fundamental. These factors include availability of nutrients already in the soil, growth habits of the crop, plant population, shade association, weed control and prevention of pests and disease of the crop.

It is a well observed fact that the number of pests and diseases affecting cardamom is not large when compared to other plantation crops like coffee, tea, rubber, etc. However, the damage done by pests to cardamom crop is quite significant. Even though accurate figures are not available, a considerable quantity of production is being lost every year due to the attack of pests. This is on a staggering scale. An estimated value of such 'untaken harvest' due to the depredation of pests and diseases may run into crores. This warrants the serious attention of all those interested in the uplift of the industry. Such a situation demands a systematic, prophylactic measures against diseases and control operations against the ranges of insects and other pests.

When we think of pests and diseases in cardamom the immediate ones that come to our mind are thrips, Katte, etc. to mention a few. If, on the one hand, Katte disease leads to the ultimate destruction of the plantation, thrips play havoc on the quality of cardamom. The ensuing months are ideal for thrips control measures. Necessary control measures will have to be adopted then and there with regard to this and other pests and diseases.

One word about the environmental condition in cardamom. The ecosystem existing in the cardamom plantation is a unique one. Care should be taken in introducing pesticides into it. Haphazard use of pesticides may result in many undesirable repercussions ultimately leading to poisoning the whole ecosystem. This will also lead to the destruction of the pollinating agents which play a major role in increasing production. Hence, while giving due importance to measures for controlling pests and diseases, equal importance should also be given to sustaining the pollinators [by using selective pesticides of short residual value.

PRODUCE BETTER CARDAMOM SEEDLINGS FOR ENSURING HIGH YIELD

ANTONY CHERIAN*

As we all know, good planting material is an important prerequisite for successful agriculture. In respect of plantation crops, planting materials are all the more important, because, once planted, it will take a long time for the grower to know the defects, if any; and by that time no remedial measures would be possible and the planter will be forced to reconcile with the materials planted. This underlines the need for being vigilant and careful in this regard.

In the case of a large number of annual crops like paddy, wheat, sugarcane, cotton, pulses, etc., improved varieties of planting materials suited to the different agroclimatic zones prevailing in the country have been evolved.

SELECTION OF SEED MATERIAL

Plantation crops like coffee, rubber and tea are also well placed when compared with cardamom, in this respect. In the case of cardamom, propagation is only from among the indigenous, time old parent stock. So utmost care is needed in the selection of mother plants for propagation. High yield and big size of the cardamom capsules are associated genetical qualities of the plants. So importance has to be

given for these characters while selecting mother plants. The best course is to select high yielding plots in known plantations, having records of high and quality production. Thereafter, individual high yielding plants having the desired qualities, both in terms of production and size of capsules in the plot should be identified as the mother plants. As cardamom production is linked with the climatic fluctuations of any one year, it is always desirable to watch the continued performance of individual mother plants selected, at least for three

years before the final selection. By and large in Kerala-Tamilnadu areas, cardamom season starts in August. The peak season is generally in the months of October-November. During this period, the plants will be in full bearing stage. It may, therefore be convenient to select the mother plants at that time. After the selection of the mother plants, the seed capsules should be allowed to ripen. These fully ripe capsules should be collected and the seeds extracted. Thereafter, the seeds should be washed thoroughly in cold water, till the



Watering the beds after sowing

*Assistant Director, Cardamom Board, Cochin - 682 018

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sweet muscilage coating is completely removed. The seeds should then be mixed with wood ash and dried in the shade for two or three days, before they are sown for germination. In order to ensure uniform germination, it is always desirable to sow the seeds in about a fortnight's time after extraction. In the Kerala region November to January is the best period for sowing the seeds. In Karnataka, it can be a little earlier i. e., sowing can be taken up in September/October months.

Sowing and aftercare of seedlings are also very important for raising good plantations. Gently sloping land with facilities for drainage and irrigation having humus rich top soil is the ideal nursery site. According to one school of scientific thought, plants having genetical potential for better growth and field performance are identifiable in the seedling stage. The attributes of such seedlings are yet to be located in cardamom. So, the best course is to provide optimum conditions for growth for all the seedlings and to select only the best among them for planting in the field.

SOWING AND AFTERCARE OF NURSERY

Some of the important aspects that merit consideration in the production of quality seedlings are briefly discussed:

Cultivate the land selected for nursery to a depth of about 30 cms. and prepare beds of size 6X1 m. and raise it to about 30 cms. Spread a thin layer of humus rich jungle soil over the bed. Sow seeds either by broadcasting or in lines. Seed rate is 10 g./Sq.m.



Seedlings in the primary nursery being protected by overhead pandal

in nurseries in Kerala-Tamilnadu region and 2g./Sq m. in nurseries in Karnataka region. After sowing, the seeds should be covered by a thin layer of fine soil and then mulched by spreading paddy straw, 'potha' grass (*Granotia stricta*) or other suitable materials to a thickness of about 2 cms. Water the beds daily both in morning and evening. Remove mulch soon after the commencement of seeds and protect seedlings from direct sunlight by providing overhead pandal. Generally germination will be noticed in 35 to 45 days time.

In Kerala-Tamilnadu region, the seedlings are transplanted to secondary nursery when they are about 6 months old. Transplanting in secondary nursery is usually avoided in Karnataka region and seedlings from primary nursery are directly planted in the field when they are about 10 months old. These seedlings may be alright for new planting or wholesale replanting. For gap

filling sturdy seedlings are better adopted. In secondary stage, prepare beds 6X1 m. size as done for primary nursery. A layer of well-rotten cattle manure and wood ash may be spread on the beds and mixed with the top 5 cms. of soil. Seedlings from primary nursery may be transplanted at a spacing of 25-30 cms. Best time for transplanting is the months of May/June. Overhead pandals should be erected before transplanting is done. Overhead pandals over a large number of beds in a secondary nursery have been found to give better results than separate pandal for each bed.

Since quite a lot of nutrients are removed by the seedlings, it will be necessary to apply fertilizer in secondary nursery, if the same site is continuously used. It has been found that as much as 120 gms. of nitrogen, 20 gms. of phosphoric acid, 300 gms. of potash, 50 gms. of magnesium and 75 gms. of calcium are

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removed on an average from a bed of 100 plants.

Beds must be adequately mulched with leaf litter.

Watering has to be done daily following transplanting of seedlings. Once the seedlings are well established, frequency of watering can be reduced to once in two or three days depending on requirement.

The beds should be kept free of weeds by attending to weeding as and when necessary.

Overhead pandal may be partially removed by April-May to induce tillering. During this period maximum growth of seedlings could be observed.

PROTECTION FROM PESTS AND DISEASES

Spraying of 1 per cent Bordeaux mixture or 0.2 per cent Difolatan at the rate of 1-1.5 litre per bed at an interval of 2-4 weeks is a routine plant protection carried out in primary nursery for prevention of various fungal disease.

DAMPING OFF

The disease makes its appearance during rainy season. Excessive soil moisture resulting from inadequate drainage and overcrowding of seedlings in the nurseries are predisposing factors for the disease incidence. The disease is caused by *Pythium* sp. The fungus infects the collar region and spreads quickly under favourable conditions. The leaves of the affected plants become yellow and later the seedlings wilt. The tissues at the collar region and rhizome decay resulting in the death of seedlings.

The control measures include provision of good drainage in the

nurseries, thin sowing to avoid overcrowding and spraying and drenching the beds with 1 per cent Bordeaux mixture, during the monsoon season. The affected seedlings are to be removed along with the root systems and the affected beds treated with the fungicide.

NURSERY LEAF SPOT

Nursery seedlings are affected by this disease during South West monsoon. The disease makes its appearance with the receipt of the first summer showers and reaches its peak in June-July. The symptoms appear on the leaves as small water soaked spots which gradually enlarge to form irregular rotten patches. The centre of the spots turns grey in colour with a yellow halo. These spots later dry up and shot holes are formed. If the spots are many and close to each other on the lamina, shredding of such leaves also occurs.

The disease is caused by *Phyllosticta eletaria* Chowdh. Spraying with Captafol 0.2 per cent (Difolatan) at 15 days intervals starting from June onwards controls the disease.

RHIZOME WEEVIL

Attack of rhizome weevil becomes a serious menace in secondary nursery and it usually happens in November-January period. The pest becomes a problem in nurseries where the same site has been used for a number of years, due to consecutive build up in the soil. It can be controlled by application of BHC at 0.1 per cent concentration, drenching the bases of plants with the spray fluid. Diel-

drin and Chlordane may be used if the pest persists.

SHOOT BORER

The shoot borer *Dichocrocis punctiferalis* Guen. is a serious pest which often attacks nursery plants. The caterpillar bores into the central core of the pseudostem as a result of which the central spindle dies and the characteristic 'dead heart' symptom is manifested. The attack is generally observed during the summer months of December to April. Sevin at 0.1 per cent concentration may be sprayed for the control of shoot borer. Alternately quinalphos (Ekalux 25 EC-0.05 per cent a.i.) leptophos (Phosvel 34 EC-0.05 per cent a.i.) or fenitrothion (Sumithion 50 EC or Folithion 50 EC-0.05 per cent a.i.) may also be used. Application may be repeated at monthly intervals if attack is severe and persistent.

MITE

Mite attack is noticed usually in November to April. It may be controlled by spraying Kelthane at the rate of 5 ml per bed after dilution to 1 litre, at one month intervals. Application of wettable sulphur at the rate of 500 gms. per acre (or 200 beds) is also an effective control measure. □

"CARDAMOM"

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CARDAMOM THRIPS

HISTORY OF THE PEST

Cardamom thrips (*Sciothrips Cardamom* RAMK) is the most destructive among the pests of cardamom. Ravages by this pest became manifested from the 1930's onwards. The thrips is a minute greyish brown insect about 1.5 mm in length. It feeds, breeds and thrives on all parts of the cardamom plant. The egg is thrust into the surface tissues of the plant and hatches in 9 to 12 days. The young ones (larve) grow by feeding on the plant sap and become adult in about 21 days. Total life cycle from egg to adult takes from 27 to 30 days. Thus 12 generations are completed in one year.

The population of the thrips on the plants fluctuates in different seasons. The peak populations are seen during the dry months of December to April and decreases with the onset of monsoon rains and remains low during the entire rainy season. Among the three varieties of Cardamom, the 'Mysore' variety (erect panicles) shows the maximum damage and the 'Malabar' variety (creeping panicles) the least. The hybrid (flexuous panicles) shows intermediate damage.

NATURE OF DAMAGE & ITS EXTENT

Damage to the crop is caused by the feeding activities of the thrips. The thrips make punctures

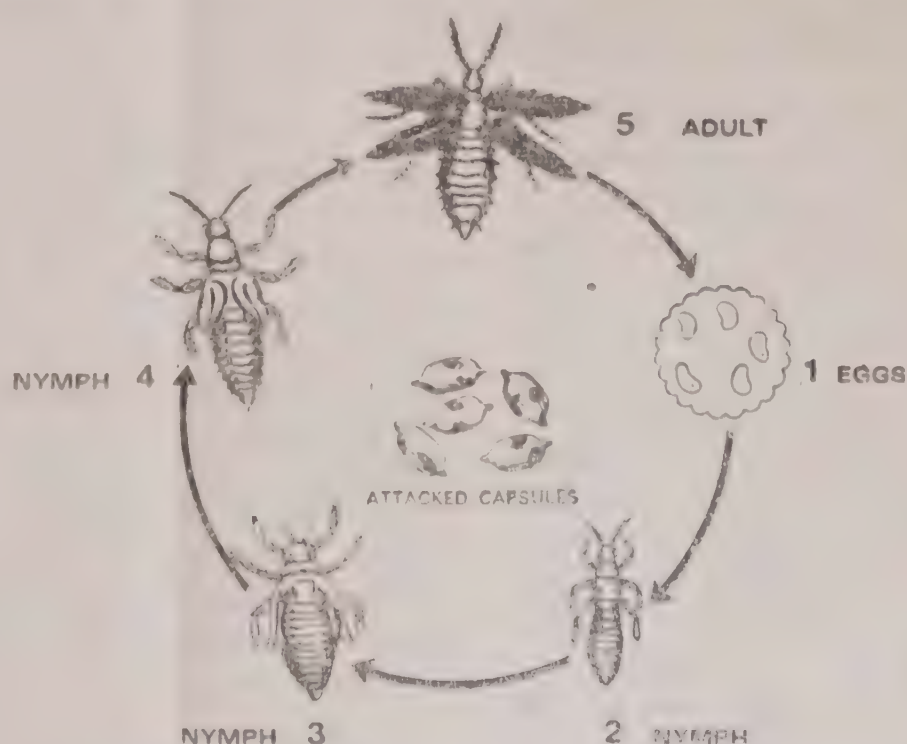
on the plant surface and feeds on the exuding sap. The tissues in this area become corky and appear as scabs or scalds. The pods suffer the greatest damage due to this sort of injury caused by the thrips. The corky encrustations formed on the capsule surface known popularly as "cardamom itch" cause the pods to become stunted, malformed and shrivelled with gaping slits in the skin. The economic loss caused by this damage is often very high. For example on an average 8845 scabbed pods as against 6810 healthy pods are needed to weight 1 kg. In terms of weight the scabbed pods may be upto 78.12 per cent on an average and in terms of number upto 82.00 per cent. The damage caused by the thrips to the

panicle stalk and flowers adds to the overall suppression of yield. The attacked panicle stalks become stunted and when the flower stalks are attacked the flowers or the tender pods drop.

The thrips has several alternate hosts which grow in the forest area. No effective natural enemies have been observed in association with the thrips so far excepting a predaceous mite.

CONTROL

Spraying of Quinalphos (Ekalax 25 EC 0.05 per cent a.i.) phenthoate (Phendal 50 EC 0.05 per cent a.i.) Monocrotophos (Nuva-cron 40 EC 0.03 per cent a.i.) Methyl Parathion (Methacid 50 EC 0.05 per cent a.i.) Fenitrothion (Sumithion 50 EC or (Continued on Page 11)



Life circle of the thrips

NEWS AND NOTES

Another Market Survey For Cardamom Abroad

The Cardamom Board is conducting a two months Market Survey for cardamom in the Selected Middle East and North African Countries jointly with the Spices Export Promotion Council under the assistance from the International Trade Centre (UNCTAD) Geneva. Shri N. Bharathan Pillai, Market Development Officer of the Board left Cochin on 29th of January 1979 (via.) Delhi for Iraq, Syria, Jordan, Egypt, Tunisia, Libya, Algeria and Morocco for an on-the-spot survey of the market for cardamom. Shri D. Devakaran, Development Officer of the Spices Export Promotion Council, is also accompanying Shri Pillai since the present survey is for cardamom and other spices as well. Mr. Fazli Husain, the Marketing Expert nominated by the International Trade Centre, Geneva, joined the team at Kuwait. The team will meet and discuss with selected importers, wholesalers, retailers, consumers, advertising agencies etc. in the different countries. The main objective of this survey is to understand the possibility of finding markets for cardamom and other spices in these countries. The present survey is on the basis of the recommendation of the earlier survey undertaken by Shri N. Bharathan Pillai in the Middle

East during November 1977-January 1978.

The team will be collecting information on the competition from other supplying countries, impact of per capita income in the oil producing North African countries on the consumption of cardamom, possibility of introducing cardamom coffee drinking habit among the Arabs in these countries as in the case of Arabs in Saudi Arabia etc. various commercial practices adopted in the different countries etc. They will try to identify the scope for penetrating into these markets as at present they are virtually untapped.

Markets like Libya, Jordan etc. offer very good potential for cardamom. But these countries are at present not importing much quantities directly from India. They are getting their present requirements of cardamom either from Kuwait, Bahrain or Dubai or from other cardamom producing countries like Guatemala and Tanzania. There is already evidence that these countries can consume a large quantity of cardamom falling in line with other Arab countries like Saudi Arabia and Kuwait. It is hoped that this on-the-spot survey in these countries will disclose new avenues for penetrating into these markets.

After the on-the-spot survey in these countries mentioned above

the team will proceed to Geneva for preparing the report with the technical assistance from International Trade Centre (UNCTAD) Geneva. They will be returning to India by the first week of April.

This is the second time that the Cardamom Board is conducting a market survey abroad under the integrated programme of technical co-operation between Government of India and ITC/SIDA. The first survey was in the Middle East and West European Countries. The entire expenditure on this project is met by ITC/SIDA.

State Nominees in the Board

Information has been received about the nomination of State representatives and member representing consumers in the recently reconstituted Cardamom Board.

Shri D. G. Wesley, I.F.S. Conservator of Forests, Kodagu Circle, Karnataka will represent the state of Karnataka whereas Shri Subramani, IAS Director of Agriculture, Tamilnadu will be the representative of Tamilnadu State.

Thri P. S. K. Lakshmipathi Raju of Palani will be the representative of the consumers in the reconstituted Board.

Equip Children for a Better Tomorrow

—Sundaram

Shri S.G. Sundaram, Chairman, Cardamom Board stressed the need for imparting maximum facilities to the children of labour in the various plantation industries in the country. Presiding over a function at St. Georges School, Kattappana in connection with the inauguration of the distribution of educational stipend to the children of Cardamom labour, he said that a better tomorrow would be theirs if adequate

facilities were extended to them for education.

Shri P. Gopalakrishnan Nair, Additional District Magistrate inaugurated the distribution of the stipend. A sum of Rs 61,000/- was distributed at the inaugural function. A total amount of Rs.4 lakhs will be distributed this year as educational stipend to the wards of cardamom labour in the various cardamom tracts in the three States of Kerala, Karnataka and Tamilnadu.



(Continued from Page 9)

Folithion 50 EC 0.05 per cent a.i.) and application of Quinalphos (Ekalux 1.5%) dust or phenthoate (Phendal 0.02% dust or Endosulfan (Thiodan 0.04%) at the rate of 25 kgs. per hectare are found effective for the control of thrips. Eight to ten rounds of spraying or dusting at monthly interval may be given skipping months of heavy rains. It is enough to spray the pesticides on the panicles and lower portions of the tillers. 200-400 ml of spray fluid will be required per plant depending on the plant size. Dusting and spraying may be alternated according to convenience.

Shri V. Narayanaswamy, Member, Cardamom Board gave away the prizes to the children who participated in the various competitions held in connection with the International Year of the Child.

Earlier Shri K. G. Nayar, Secretary, Cardamom Board welcomed the gathering Shri Thomas Mathew, Farm Manager, Indian Cardamom Research Institute proposed a vote of thanks

Land for Board's Head Quarters

A long cherished dream of the Cardamom Board has come true with the acquisition of land for the construction of its headquarters at Cochin. This land of about 0.50 Ha (1 acre 3 cents) is situated on the side of Cochin Bypass in Palarivattom, Cochin.

The land was taken possession of at a simple function by Shri K. V. George, Director of Cardamom Board on 29th January 1979.

J. Thomas Elected Vice Chairman

Shri J. Thomas, Chairman, M/s. A V. Thomas and Company, Madras was elected Vice Chairman to Cardamom Board for a period of one year at a meeting of the reconstituted Board held at Bangalore.

Shri Thomas (51) after completing his college education in Madras had his higher education in London. He is a fellow of the Institute of Commerce, London.

As Director from 1950 and as Chairman from 1968, Shri Thomas was responsible for the extension and development of Cardamom cultivation in the estates owned by M/s.A.V.Thomas group of companies. It may be pointed out that M/s. A. V. T. is the largest single producers of cardamom in India. Shri Thomas represents the large growers of cardamom on the reconstituted Cardamom Board.

Shri Thomas plays Golf and takes active interest in horse race. He is a member of the managing committee of the Madras Race Club for the last 12 years

Concentration of the formulation	Quantity of pesticide in ml. to prepare one litre of spray fluid	Concentration of spray fluid in % a.i.*
50 EC	1.00	0.05
25 EC	2.00	0.05
34 EC	1.50	0.05
40 EC	0.75	0.03

*a.i.: active ingredient ☐

V. N. S. Bags Export Award

Smt. Jyothi Venkatachellum, Governor of Kerala called for organised and systematic efforts to help small scale producers and exporters of spices. She was speaking at a function held in connection with the distribution of awards for outstanding export performance of spices and spice products in 1978.

M/s. V N. Surulivel Nadar & Brothers, Bodinayakanur were awarded the silver shield for the outstanding export performance of cardamom in 1978. Other recipients of the award were:

1. M/s. Gandhisons, Bombay. (Spices)
2. M/s. Navabharat Enterprises Cochin. (Pepper)
3. M/s. Brooke Bond India Ltd., Cochin. (Chillies)
4. M/s. Parekh Brothers, Calicut. (Ginger)
5. M/s. Biddle Sawyer (P) Ltd., Bombay. (Turmeric & Minor Spices)
6. M/s. P. Mittulal Lalah & Sons, Madras. (Curry powder)
7. M/s. Bombay Oil Industries (P) Ltd., Bombay. (Oil & Oleoresins)

Shri T. Tharanath Shet, Chairman, SEPC welcomed the guests. Shri J. V. Mariawala, Vice Chairman proposed a vote of thanks.

Committees of the Board

The following members were elected to the various committees of the Board at the first meeting of the reconstituted Cardamom Board held at Bangalore on 19th January 1979.

Shri T. K. S. Manoharan
Shri Ajmal Khan
Major P. P. Ponnappa (Retd.)
Dr. Henry Austin, M. P.
Shri K. S. Scaria
Shri K. P. Purushothaman Nair

Airlines Foreign Travel Tax

The Finance Ministry is understood to be considering a proposal by Air-India and some other airlines that the 12.5 per cent foreign travel tax imposed recently should be replaced by a suitable increase in the departure fee which is currently being levied at the rate of Rs. 20/- per passenger leaving the Indian Airports for travel abroad. The suggestion has been made in view of the fact that some airlines and unauthorised travel agents are misusing the facility of paid ticket advice as a result of which nearly 40 per cent of passengers going abroad from this country are dodging the foreign travel tax.

The current Rs. 20/- departure fee is yielding about Rs. 3 crores per annum. The total receipts from foreign travel, including the foreign travel tax, were expected to yield about Rs. 10 crores. The loss of revenue owing to the abolition of the foreign travel tax, it is felt, can be well counter-balanced if the departure fee is enhanced to \$ 8 per passenger. At this level of departure fee, the yield is expected to be Rs. 11.5 crores.

World Pepper Meet in Cochin

A four day meeting of the Pepper Community Panel on Techno-Economic studies was held in Cochin from 31st January to 4th February.

Shri Arif Baig, Union State Minister for Commerce, Civil supplies and Co-operation who inaugurated the meeting stressed the need for solving the bottlenecks in the international trade in pepper. He also referred to the frequent fluctuations in the prices of pepper in the international market and expressed the hope that the deliberations of the meeting would be of relevance to the various interests.

About 22 delegates representing the pepper growing countries viz. India, Indonesia, Malaysia and experts of ESCAP, ITC, FAO, UNIDO, etc. participated in the meeting.

Shri L.N. Saklani, Director, Pepper Community welcomed the delegates. Shri R. D. Shah, Chairman, SEPC proposed a vote of thanks.

Fertilizer Output

At the beginning of the year 1978-79, the target of fertilizer production for the manufacturers was fixed at 2.5 million tonnes of nitrogen and 800,000 tonnes of phosphate. The production target now proposed to be fixed for the year, after taking into account the revised dates for commissioning of new plants, constraints on availability of power, raw materials, etc., is 2.25 million tonnes of nitrogen and 750,000 tonnes of phosphate.

(Continued on Page 45)

In the News

Shri S. G. Sundaram, Chairman Cardamom Board being introduced to Shri George Fernandes, Union Minister for Industries by Shri Mohan Dharia, Union Minister for Commerce, Civil Supplies and Co-operation at the Rubber Conference held in Delhi on 9th January 1979



Board's decorated van at the Floral Motorcade held in Cochin in connection with the Cochin Flower Show 1979

Shri S. G. Sundaram laying the foundation stone for the new wing of the Govt. Hospital, Kattappana. Right: Shri V.T. Sebastian M L A receiving the cheque for Rs. 20,000 from Shri Sundaram for the construction of the new wing, as grant in aid from Cardamom Board.





Shri K. K. Goyal, Union State Minister for Commerce, Civil Supplies and Co-operation at Bodinayakanur with Cardamom planters, exporters and Shri S.G. Sundaram, Chairman, Cardamom Board.

Shri K. K. Goyal, receiving a cheque for Rs. 1,00,000/- towards P.M's National Relief Fund from Shri Sundaram on behalf of Cardamom planters and traders.



Smt. Jyothi Venkitachellum, Governor of Kerala presenting the SEPC Awards for best export per. J. M. Gandhi (M/s. Gandhi Sons, Bombay) Shri V. N. Surulivel Nadar (M/s V. N. Surulivel Nadar & Brothers, Calicut), Shri P. A. Shah (M/s. Biddle Sawyer Pvt. Ltd., Bombay) Shri N. R. S. Manrao





Shri Arif Baig, Union State Minister for Commerce, Civil Supplies and Co-operation seen with the delegates at the World Pepper Meet (PEPPERTECH) in Cochin on 31 Jan. 1979.



Sri K. V. George Director, Cardamom Board receiving a coconut from Shri P. T. Manuel, owner of the land on the occasion of taking possession of the land purchased by the Board for the construction of its HQ building.

Finance in Spices during 1978. From R to L: Shri Prabhu (M/s Navabharat Enterprises, Cochin) Shri Bodinayakanur), Shri M. K. K. Menon (M/s Brook Bond India Ltd, Cochin) Shri M. N. Parekh (M/s. Parekh M/s P. Mittulal Lalah & Sons, Madras) and Shri T.V. Mariwala (M/s Bombay Oil Industries Ltd, Bombay)





*Shri S. G. Sundaram, Chairman,
Presiding over the first meeting
of the reconstituted Board held
in Bangalore on 19th Jan. 1979*



*A View of the members
at the Board meeting*

Shri P. Gopalakrishnan Nair, Addl. Dist. Magistrate, Idukki, inaugurating Board's Educational Stipend distribution held at St. Georges High School, Kattappana. S/Shri S. G. Sundaram, Thomas Joseph MLA and Dr. M. J. George are also seen.



QATAR

Following is an excerpt on Qatar from the report on the market survey jointly carried out by Cardamom Board and International Trade Centre, Geneva in the Middle East and West European countries. The survey team consisted of Shri N. Bharathan Pillai, Market Development Officer, Cardamom Board and Mr. Brian Mc. Loughlin Marketing Consultant, International Trade Centre. Excerpts on Kuwait, Bahrain and Iran appeared in the July-August, September-October and November-December 1978 issues respectively. —EDITOR

INTRODUCTION

Qatar is the smallest of the prime cardamom markets studied in the Middle East. Despite a population of under 100,000 the volume of recorded cardamom imports is now nearly 75 tonnes. This gives the Qataris the highest per capita consumption in the world—over 800 grams per head per annum. Cardamom consumption in Qatar is such an integral part of life, that the Government regard cardamom as an essential staple food item.

IMPORT HISTORY

The mean level of import of cardamom over the five years to 1976 was 65 tonnes per annum. A trough of imports in 1974 has been followed by a sharp increase in 1975 and a further 10 per cent volume gain in 1976. It should be noted, however, that the official import figures as set out in Table-2 under-estimate the true situation—much of the cardamom imported from Bahrain and other neighbouring states goes unrecorded. True imports and annual

consumption is estimated to be as much as 150 tonnes.

In terms of market share, India is the only producing country to have a significant share position established. The balance of imports tends to come from non-producing entrepôts such as Bahrain, Kuwait and Dubai, but probably some are of Indian origin. Bahrain is by far the most important source; in some years Bahrain supplies more than

half the volume imported into Qatar. And since it is known (c.f. market report on Bahrain) that Guatemala has achieved a high level of penetration in the Bahrain market, it can be deduced that much of the cardamom imported from there to Qatar is of Guatemalan origin.

Full details of the share of imports by source to Qatar are set out in the following table:

Table - 1
SHARE OF IMPORTS - VOLUME BASIS

	1972 %	1973 %	1974 %	1975 %	1976 %
Producing Countries:					
India	61.1	26.3	27.8	25.2	57.5
Guatemala	—	—	1.2	14.0	—
Sri Lanka	—	—	2.3	3.6	—
Non-Producing Countries:					
Bahrain	29.2	60.5	52.6	3.77	41.9
Dubai	7.8	11.8	0.7	5.9	—
Kuwait	—	1.3	10.9	2.7	—
Others	1.9	0.1	4.5	18.9	0.6
	100.0	100.0	100.0	100.0	100.0

Source: Compiled from National Foreign Trade Statistics—Qatar.

Exports of cardamom from India to Qatar show an erratic pattern. Details are given in Table-3 which illustrates that the main demand from Qatar is for good quality Alleppey Green cardamom.

USAGE

Gahwa, or Cardamom Coffee, is the principal usage for cardamom in Qatar. Trade estimates put the proportion of volume for Gahwa preparation as 75-90 per cent of total imports—the balance being used in the preparation of cooked dishes including biryanis and other Indian dishes which have become an accepted part of Arab diet in Qatar.

The Qatari preference is for top quality cardamom; only very large, green Alleppey has a market in Qatar, according to trade sources, a view confirmed in store visits in Doha.

Gahwa consumption is virtually universal in Qatar among the indigenous Arab population. And the tradition is so strong that long standing immigrants such as Palestinians and Jordanians, must also adopt the Gahwa tradition.

Gahwa is consumed throughout the year and any apparent consumption peak in the pre-Haj period is a factor of trading patterns rather than of consumer usage.

CONSUMER PATTERNS

The population of Qatar is claimed to be in the region of 100,000. In fact, this is an estimate of the population of Qatari nationals. A more realistic estimate of the true number

Table-2
IMPORT OF CARDAMOM INTO QATAR - BY SOURCE

Year	Source	Quantity (M.T.)	Value	
			Rs. ('000s)	(\$ '000s)
1971	India	48.5	2,687	372.5
	Guatemala	2.5	181	25.1
	Sri Lanka	0.3	17	2.3
	Bahrain	10.9	597	82.8
	Dubai	2.6	181	25.1
	Total	64.8	3,663	507.8
1972	India	39.6	1,989	248.3
	Guatemala
	Bahrain	18.9	764	95.3
	Dubai	5.1	199	24.9
	Thailand	1.0	19	2.4
	Others	0.2	18	2.3
	Total	64.8	2,989	373.2
1973	India	20.0	1,117	137.4
	Bahrain	46.0	1,937	238.3
	Dubai	9.0	406	49.9
	Kuwait	1.0	32	3.9
	Total	76.0	3,492	429.5
1974	India	12.0	1,163	144.0
	Bahrain	22.7	1,801	223.0
	Dubai	0.3	32	4.0
	Guatemala	0.5	40	5.0
	Sri Lanka	1.0	73	9.0
	Kuwait	4.7	347	43.0
	Jordan	1.5	97	12.0
	U.S.A.	0.5	48	5.8
	Total	43.2	3,601	445.8
1975	Dubai	4.0	313	35.0
	Singapore	3.3	36	4.0
	India	16.9	1,716	192.0
	Bahrain	25.3	2,851	319.0
	Iran	0.1	18	2.0
	U.S.A.	3.6	375	42.0
	Spain	0.4	116	13.0
	Kuwait	1.8	170	19.0
	Sri Lanka	2.4	161	18.0
	Guatemala	9.4	894	100.0
	Total	67.2	6,650	744.0
1976	India	42.7	5,346	602.0
	Bahrain	31.1	2,229	251.0
	Spain	0.1	71	8.0
	U.S.A.	0.3	80	9.0
	Total	74.2	7,726	870.0

Source: National Foreign Trade Statistics — Qatar.

Table 3

EXPORT OF CARDAMOM FROM INDIA TO QATAR DURING
1971-72 To 1975-76

Year	Grades	Quantity (M.T.)	Value	
			Rs. ('000s)	\$ ('000s)
1971-72	Alleppey Green	63	2,763	325.1
	Coorg Green	2	100	11.8
	Bleached/Bleachable	4	191	22.5
	Seeds	—	—	—
	Others Mixed	—	—	—
	Total	69	3,054	359.4
1972-73	Alleppey Green	32	1,762	207.3
	Coorg Green	—	—	—
	Bleached/Bleachable	2	146	17.2
	Seeds	—	—	—
	Others Mixed	—	—	—
	Total	34	1,908	224.5
1973-74	Alleppey Green	11	773	90.9
	Coorg Green	—	—	—
	Bleached/Bleachable	—	—	—
	Seeds	—	—	—
	Others Mixed	—	—	—
	Total	11	773	90.9
1974-75	Alleppey Green	12	1,274	149.9
	Coorg Green	6	519	61.1
	Bleached/Bleachable	1	25	2.9
	Seeds	—	—	—
	Others Mixed	—	—	—
	Total	19	1,818	213.9
1975-76	Alleppey Green	49	4,629	544.6
	Coorg Green	5	494	58.1
	Bleached/Bleachable	—	—	—
	Seeds	—	—	—
	Others Mixed	—	—	—
	Total	54	5,123	602.7

Source: Cardamom Board, India.

of people resident in Qatar is 300,000 mainly comprising immigrants. In fact, some estimates put the national population as low as 65,000.

There is no reliable demographic data on Qatar, so details of the population by age, sex, household income or other statistical measures are not available. It is

known, however, that all Qatar nationals enjoy free housing, free education and free medical care.

Virtually all of the Gross National Product derives from oil - 96 per cent is the latest estimate while the balance is accounted for by very small local level industry and trading.

DISTRIBUTION

The main importers of cardamom to Qatar, at present, are whole saler/importers based in Doha. These outlets sell to between 200-300 retailers without an intermediate sub-wholesaler level.

Wholesaler importers for cardamom are not specialised. They all handle a wide range of other grocery products as well as other non-grocery products.

The retail segment of the trade is also non-specialised. Most outlets handle a very extensive range of food—fresh, canned and frozen. Individual stores tend to be somewhat larger in size than elsewhere in the Gulf area. In style, these outlets are closer to the "cold store" as seen in Bahrain, with partial self-service. Massive and almost continuous reconstruction of the Souk areas in Doha has led to this development of larger store units.

Trading of cardamom at the retail level is in bulk. The common method of sale is to have a large sack of cardamom open in the store. Thus, the consumer can closely examine the quality of the cardamom available, handle it and even taste it. Units of purchase—at the retail level—are normally of weights of $\frac{1}{2}$ kg. and 1 kg. This size of purchase is common both because of the high level of home consumption, and because of an acute shortage of small change which mitigates against small-scale purchases at the retail point.

There are no fixed trading relationships between retailers and wholesale suppliers. Retailers

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shop around the wholesale outlets to obtain the most favourable prices. For cardamom the retailers will also change wholesaler to obtain the optimum quality available. Accordingly, no importer/wholesaler in Qatar can carry anything less than the top qualities of cardamom. However, the distribution channels in Qatar are supported by very long credit lines. Upto six months credit on a rolling basis is frequently allowed by wholesalers, thus creating some loyalty between the retailer and individual wholesalers and importers.

Retail and wholesale margins in Qatar are high. Wholesalers sell to retailers at 30 per cent - plus on the C & F price, while the retailer mark-up can frequently be as high as 100 per cent of their wholesale buying price. In periods when supplies of cardamom are scarce, the importer margin can increase enormously and wholesale margins of upto 100 per cent have sometimes been reported.

This distribution pattern will change radically, as a consequence of the decision by the Government of Qatar to import cardamom for subsidised distribution. This cardamom will be distributed through three retail outlets only, supplied directly from the warehouse of the Ministry of Civil Supply. Each resident of Qatar, nationals and expatriates alike, will be issued with a ration voucher giving entitlement to $\frac{1}{2}$ kilo of cardamom per person each month at the special price of Q. Rls 100 per kilo. The current open market price is Q Rls 150 per kilo.

A distribution margin of Q. Rls 5 per kilo will be given to the

three distributors, who will be supplied at Q Rls 95 per kilo for sale at Q Rls 100.

The free trade in cardamom will continue in parallel with the State subsidised scheme. The price competition from the subsidy scheme will, almost certainly, cause the decline of cardamom as an open market commodity

IMPORT PRACTICES

Cardamom is currently imported to Qatar by wholesaler/importers who buy and import from the country of origin or from importers in Bahrain and Dubai. Direct import from the country of origin which is normally India, is preferred. Port delays at Doha, however, frequently preclude direct imports. In 1976, for example, the delay for a berth at Doha was 6-7 months and even today a vessel can wait for 25-30 days to move onto one of the few deep water berths.

Purchase through Bahrain or similar entrepôts eliminates these delays. More recently air freight has proved a practical way of importing cardamom direct from Bombay. Qatar has good air connections and air transportation can overcome the problems of port delay. It can also ensure that new crop cardamom is on sale well before the trading hiatus for the Haj festival.

Many importers use indenting agents for the actual purchase of cardamom and for the administration of the importing procedures. The importers, however, maintain direct communication links with the larger Indian exporters, to ensure that the quality of the goods for which

their agents indent meets the high standards required for the Qatar market.

There is considerable concern in the trade in Qatar about the varying standards of quality in the imports from India. Instances of 'marked divergences in quality between initial sample and delivered volume are frequently reported and are creating a major credibility problem for Indian produce. Careful quality control is essential for this market because of the very high consumer standards. So, too is greater attention to packaging Standards. Since good colour is one of the principal factors of appeal to the Qatari consumer, it is essential that best quality packing is used to maintain and preserve the colour.

The general attitudes of the cardamom importing trade are that, provided cardamom of sufficient quality is available, there will always be buoyant demand in Qatar — irrespective almost of price. They see cardamom consumption as such an entrenched habit among Qataris, that the price can continue to rise sharply without much effect on demand — if the quality is commensurate with the price.

This sanguine view of price/volume relationships is not shared by the Government of Qatar. They regard cardamom as a staple commodity in the diet of the local population. The Government now propose to import all cardamom required for the Qatar market — about 150 tonnes per annum — by direct Government import contract from India. A single supply contract will be placed each year to cover estimated requirements for delivery—

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in phased lots. A single Letter of Credit will be opened in favour of an Indian exporter, who will be expected to post a 5 per cent performance bond. While part shipment will be expected, no trans-shipment will be allowed, so special shipping arrangements may be necessary. A special requirement of the Ministry of Civil Supply is that the price quotation for supply to them should be valid for at least seven days. Exporters must also expect a delay of upto one month in the opening of the Letter of Credit, due solely to the administrative problems involved in the Government departments concerned.

TARIFFS AND REGULATIONS

An import duty of $2\frac{1}{2}$ per cent advalorem is levied on all food-stuffs imported into Qatar. Cardamom is classified as a food-stuff and is therefore subject to this duty. No other regulations at present restrict the importation and distribution of cardamom in Qatar.

Regulations are now being introduced to restrict the export of cardamom, and other subsidised foodstuffs. Only private export by individuals for their own use will be allowed, and the maximum weight of cardamom permitted to be exported is 10 kilos.

PROMOTION

There is no advertising and promotion of cardamom in Qatar at present.

DEMAND ASSESSMENT

The import statistics for cardamom in Qatar indicate an annual

consumption of about 60-65 tonnes. However, these take no account of the unrecorded shipments which are a major feature of cardamom trading in the Persian Gulf area. A more realistic market size estimate is 130-150 tonnes. This corresponds closely to the estimate of total consumption made by key importers. There is also, probably, some element of unrecorded re-exports; Qatar adjoins South-East Saudi Arabia and probably serves as a natural marketing centre for part of this prime cardamom-consuming nation. It has not been possible to quantify the scale of these re-exports. Every importer claims to be supplying the Qatar domestic market only.

Demand is buoyant and steady growth in volume is anticipated. Contributing to growth is increased consumption among existing users as incomes and spending power grows. Also, the consuming population is rising as the local life styles are adopted by Palestinian and Jordanian immigrants.

It is, however, difficult to make any realistic assessment of future demand in view of the proposed subsidy on cardamom.

Demand will certainly grow but it will benefit only those suppliers who win the Government contracts for cardamom supply. To achieve this, exporters in India must be prepared to co-operate rather than compete to quote realistic prices and to maintain and improve quality standards.

PROPOSED STRATEGIES

The promotional objective for Indian Cardamom in Qatar should

be to obtain and retain the supply contract from the Government of Qatar for the quantities required to fulfil the demand for subsidised cardamom. To obtain this contract Indian exporters must quote realistic prices probably on a forward basis, deliver as per contract and maintain quality at that specified throughout the year. No other strategies will be necessary, since the demand will rise with subsidised prices. However, failure to adopt these strategies could mean the loss of not only the current recorded 65 tonnes per annum to other supply sources, but also the balance of 65 tonnes currently imported through entrepôts. It would also mean the loss of future volume of upwards on 200 tonnes per annum.

The attitude of the Government of Qatar can also be regarded as a precedent for other Middle East States. The cardamom industry in India must anticipate an increasing amount of centralised purchasing at Government level and organise itself to operate in this marketing context. □

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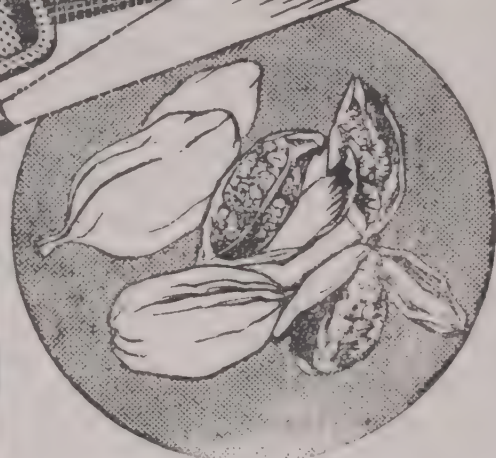
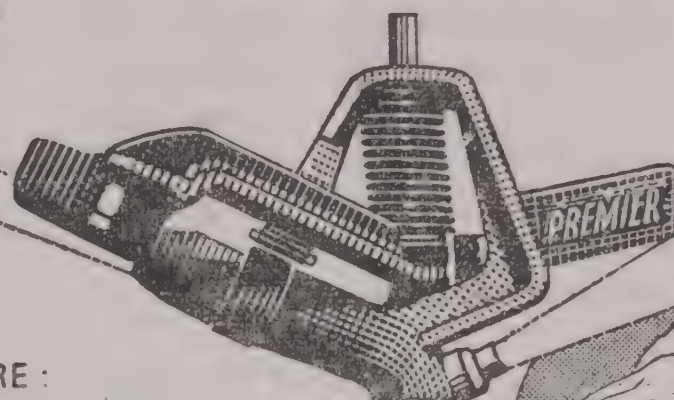
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DEMONSTRATION OF SCIENTIFIC PRODUCTION PRACTICES

The following is the third of the series on the various services/schemes of the Board for the development of the cardamom industry in the country. The first and second schemes dealt with Extension Advisory Service and Agricultural equipments on Hire Purchase. It is expected that this will give an opportunity for all interested sections connected with the industry to make use of these services as and when occasion arises.

—EDITOR

Increasing competition from other cardamom producing countries underlines the need for stepping up the production, both in quantitative and qualitative terms, for the survival of the Industry, as well as for increased foreign exchange earning to the country. While it is possible to obtain yields of 100 to 125 kgs. per hectare under requisite environs and with improved cultivation practices, the average annual productivity of cardamom in the country is estimated at 35 to 50 kgs. per hectare. This points out the scope for improving productivity even with the existing planting material. Adoption of intensive cultivation practices, viz., timely application of adequate quantities of balanced fertilizers, effective schedules of plant protection and cultural operations, will go a long way in achieving this objective.

Although, cardamom industry has been the virtual monopoly of the country from time immemorial, no serious efforts have so far been made to improve the

techniques of cardamom cultivation and production on sound scientific principles. The situation has been aggravated by the fact that the vast majority of cardamom holdings are small and medium sized ones, where due to ignorance on the part of the owners, financial limitations and various other restraints, there has not been any effort for increasing productivity and quality of cardamom. Thus, it is imperative to educate the growers of the advantages of improved methods of cardamom culture, based on sound scientific principles.

The objective of the scheme is to demonstrate to the cardamom growers, the scope for enhancing productivity by adopting improved methods of cardamom culture. Under this scheme demonstration plots are laid out in all the three cardamom growing states viz. Kerala, Tamilnadu and Karnataka.

For the selection of the demonstration plots, the following will be the guiding factors:

- (1) The plantation selected for demonstration purpose should preferably be by the side of a public road and owned by a registered small grower owning not more than 20 acres.
- (2) Preference will be given to owners having their own curing facilities.
- (3) The plants in the area should be in the age group of 5 to 10 years.
- (4) The area should have a minimum of 75% of the plant population calculated on the basis of the spacing adopted; in other words, there should not be more than 25% vacancies.
- (5) Plantations with plants in a badly degenerated diseased condition and beyond rejuvenation as well as those maintained at a high level of cultivation will be avoided; those plantations maintained at average levels of cultivation and corresponding productivity will only be selected.



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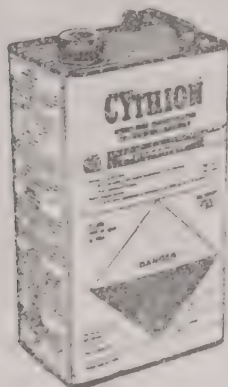
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(6) The environmental conditions including soil, shade, climate etc., in and around the plot should be congenial for successful cardamom cultivation.

(7) The Board should be satisfied that the plot is suitable for the purpose in all respects.

The Chairman, Cardamom Board, on consideration of applications will, at his discretion, select the demonstration plots on the basis of the above mentioned requirements and on such other terms and conditions he thinks fit and in such manner he considers desirable. The Chairman may depute any person for assisting him in the selection of the plot, if and when considered necessary.

The scheme will operate in a plot normally for a period of 5 years. The owner of the selected plot will have to carry out the various cultural operations as per conditions prescribed and provide the necessary labour for carrying out the same in time. The owner will possess the plots and he will have the right to enjoy the benefits completely, by collecting the produce from the plot for himself. The owner of the plot should be willing to participate in the demonstration throughout the period. He will have to execute an agreement with the Board agreeing to carry out all items of work prescribed in time and to the terms and conditions laid down.

ASSISTANCE FROM THE BOARD

1. Technical

Free technical assistance will be given by the Board at all stages. All operations in the

plot will be supervised by the Board's staff free of cost, whenever necessary. The Field Officer/Junior Field Officer of the locality will supervise the maintenance and up-keep of the demonstration plot. The labour required for the various operations in the plot from time to time, will be provided by the owner of the plot at his cost.

2. Financial

(a) Planting material required for gap filling operations in the plot will be supplied free of cost by the Board.

(b) Pesticides required for plant protection measures will be supplied free of cost by the Board, during the scheme period.

(c) Fertilizers required for application in the plot will be supplied by the Board free of cost.

FINANCIAL REQUIREMENTS

The area of the demonstration plots proposed to be set up under the scheme is between one to five acres. (On an average, the area of each of the plot may be around 1 hectare).

(a) Planting material

Since the plots selected will not be the best maintained ones, we may expect about 25% to be unhealthy/unproductive plants. Provision for gap filling and or replacements at the rate of 25% may therefore become necessary in the 1st year so as to ensure optimum plant population. Annual replacements on account of failures due to drought, pests and diseases etc. is calculated at the

rate of 10% during the 2nd, 3rd, 4th and 5th years. Considering the spacing adopted in Kerala-Tamilnadu region i.e. 2.45 m x 2.45 m to 3.04 m x 3.04 m, we may expect an average plant population of 1500 per hectare. Provision for replacements has to be of the order of 375 plants in the 1st year and 150 plants annually in the 2nd, 3rd, 4th and 5th years respectively per hectare. Similarly, in Karnataka region, with a plant population of 3000 per hectare at the normally adopted spacing of 1.83 m x 1.83 m, provision for replacement in the 1st year will be 750 plants and 300 plants in the second, third and fourth years respectively.

The cost on account of the above will be Rs 185/- per hectare in the 1st year and Rs. 75/- annually during the 2nd, 3rd, 4th and 5th years respectively. (Calculated at the rate of Rs. 0.50 per seedling in Kerala-Tamilnadu region and Rs. 0.25 per seedling in Karnataka region).

(b) Pesticides

Fungal diseases like leaf-spot, leafrot, clumprot fruit and panicle rot, fruit drop etc., are common in cardamom plantations. Bordeaux mixture, fixed copper fungicides, organic fungicides etc. are useful for the control of these diseases. Hence, prophylactic/control measures against these diseases are of considerable importance. A minimum of two rounds spraying is necessary. For calculation of the cost factor, 1% Bordeaux mixture, the most commonly used fungicide is considered. Two rounds of sprays with 1% Bordeaux mixture at 560 litres per hectare cost about Rs. 100/- per hectare (cost of chemicals alone).

Thrips and aphids are the two common insect pests for which routine insecticidal control is warranted. The following integrated insecticidal schedule is therefore necessary for the effective control of these pests:

- (1) Three applications of Parathion compounds. (Two rounds spraying and one round dusting).
- (2) Four applications of Chlorinated hydrocarbon insecticides (Two rounds spraying and two rounds dusting).
- (3) One round spraying with a systemic insecticide. Various formulations falling under

the above categories are used. On the basis of 400 liters of spray solution per hectare per round and 20 kgs. of dust per hectare per round, the cost of the insecticides is worked out at about Rs. 185/- per hectare. Thus the total cost on fungicides and insecticides required will be about Rs. 285/- per hectare per annum.

(c) Fertilizers

Soil test studies so far undertaken indicate that the requirement of fertilizer dose is not likely to exceed 56 kgs of Nitrogen, 68 kgs. of Phosphoric acid and 68 kgs. of Potash per

hectare. In addition to the above N.P.K. fertilizers, in some cases it may be necessary to apply lime/dolomite at the rate of about 1360 kgs. per hectare during April-May period before the onset of regular monsoon. The cost of the above fertilizers and soil amendments required to be applied is estimated at about Rs. 525/- per hectare.

(d) Miscellaneous items

Miscellaneous expenditure towards preparation of sign boards etc. may cost about Rs. 125/- per hectare in the 1st year and Rs. 60/- annually from the 2nd year onwards.

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OUR ENVIRONMENT

(Condensed from 'Only One Earth' by Barbara Ward and Rene Dubos)

The unifying force of nature is so tremendous and majestic that everything is interconnected and interdependent. On ultimate analysis everything is energy. Matter and energy are different aspects of the same fundamental reality and in all their manifestations obey ineluctable cosmic laws. The operation of these laws through the infinite varieties of material things and energies generate another kind of unity — the dynamic equilibrium of biological forces held in position by checks and balances of a most delicate sort.

The interplay between vast cosmic unities and the minute instruments of equilibrium is the very stuff of existence. We know that the energy of the sun is poured out in almost limitless bounty and the intermediaries and products of all this bounty — the innumerable varieties of flora and fauna — are far from limitless. Remove the green cover from the soil of Central Africa and it becomes a brick hard, everlasting laterite. Out down the forests, overgraze the grass and the productive land turns to desert. Overload the waters with sewage or nutrients, and algae consumes its oxygen, fish die and produce stinking gas as they decompose.

it is because there are so many potential paths towards points of

irreversible, no return' that the self-repairing cycles underlying all living systems — the unities of dynamic balance we call 'ecosystems' — cannot survive indefinite overloading or mistreatment. Admittedly, the regenerative powers of life are astonishing. Living things have survived the glaciations, the volcanic convulsions, the earth quakes, typhoons and tidal waves that has torn through our unstable planet over the billennia. But there is a range to this stability and resistance. We have had enough lessons to be concerned over the delicate and fragile nature of our ecosystem.

STABILITY THROUGH INTERDEPENDANCE

The intimate, inescapable interdependance of living things implies a certain stability, a certain dynamic reciprocity. Its weakening or destruction unleashes the capacity of creatures to destroy each other and themselves as well.

Stable environmental relationships imply an interconnected variety of food chains and food webs which contribute the grids of energy upon which survival depends. A typical food chain is a sort of pyramid. At the bottom are the plants which use minerals from soil and energy from the sun light to produce

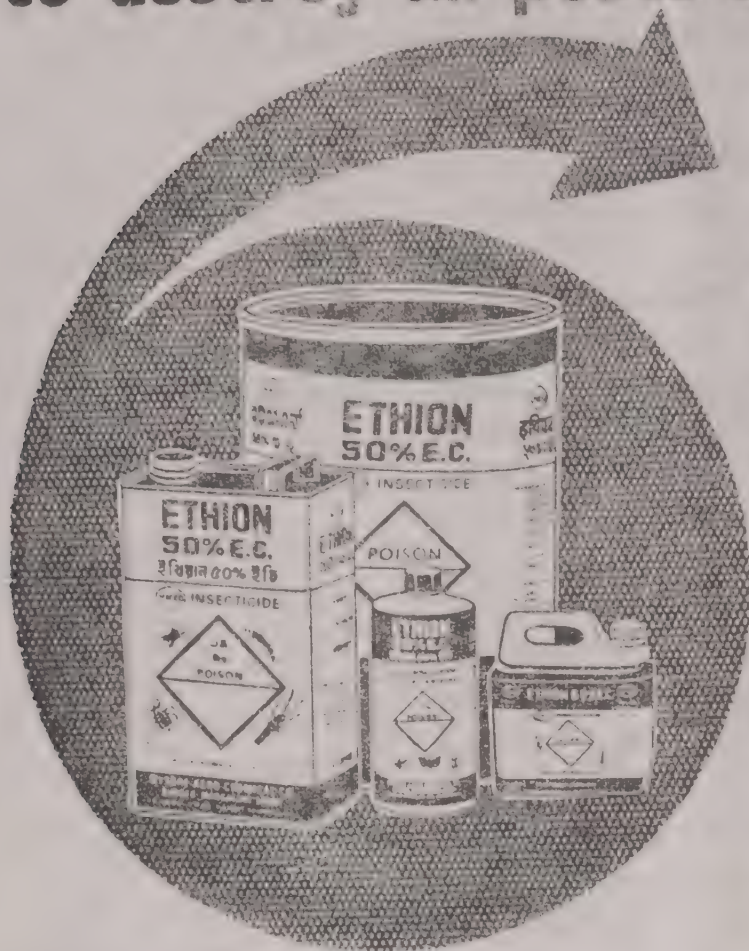
their own tissues. Then comes the herbivorous animals which feed on the plants. Then the flesh eating animals or carnivorous which are fewer in number than the herbivorous. Finally, there is man the most successful hunter (or predator) of them all.

There exists in a forest a great variety of food chains. In a mature forest — a so-called 'climax' ecosystem — all the so-called food chains are self-sustaining. In theory, the climax ecosystem can thus live its life of gently rapacious vitality for millennia.

The forest is only an illustration of one of nature's infinitely various food chains, each with its composition and complexity. Chains interconnect with each other to form 'webs' which include the widest variety of plants and animals. Some chains can extend across continents, for example through birds which are part of them.

Although ecosystems can be extremely stable, many are vulnerable. An extreme form of ecological shock occurs when there is a break down of the natural mechanisms built into nature for self protection and self-renewal. Upheavals happen with the sudden introduction of some new factor — biological species or chemical — which has no established links with existing patterns.

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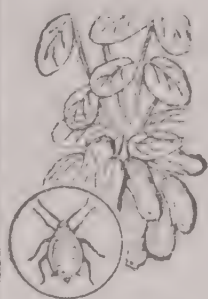
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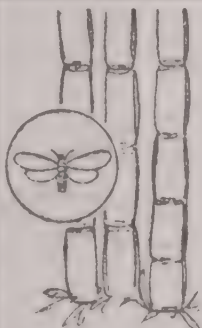
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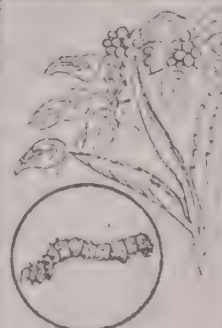
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HUMAN INTERFERENCE

Into this incredibly complex biosphere rich in animals and plant species with their songs, colours, scents — but also with their falls and challenges emerged a new species called *Homo sapiens*, approximately 100,000 years ago. This brought into play on earth a type of force different in kind from other natural forces, a creature both within the natural system and capable of seeing his place within it and even entertaining the illusion that he could manipulate, command and conquer it wholly for his own designs. There started a never ending clash with the orderly behaviour of nature.

This new species multiplied enormously. The population which was around 400 millions at the time of the fall of Rome rose to a billion (1000 millions) around AD 1600 within a period of about 1000 years. The second billion arrived after only three hundred years in 1900. The third took only fifty years. We are well on our way to the fourth in about only thirty years — by 1980.

Energy and material requirements of the human race increased not in proportion to the population increase but much more than that. This tends to the rapid decline of natural resources, pollution of air, water and land as a result of high energy consumption — utilising all possible energy sources from coal and oil to nuclear energy and the disposal of huge quantities of unwanted materials. Today it has been estimated that, on an average, a citizen in

the world's wealthiest country — the United States — carries eleven tonnes of steel around with him in cars and household equipments, and produces each year one tonne of wastes of all sorts. These brief indications are enough to show that the impact of man and his technology on his natural environment and resources is already radically different from anything yet experienced in human history.

POLLUTION

Pollution takes place in air, water and soil, the three main constituent elements of our planetary life. The atmosphere of airs and climates, the hydrosphere of rivers, lakes and oceans, the lithosphere from which rock has crumbled away over the millennia to give us our thin and fragile envelope of soil are all inextricable interwoven in all the systems which support organic life. Without their continuous interaction through all the cons of our planet's existence our little biosphere of living things would never have come into being. It is then perfectly obvious that the interactions of air and soil and water continue to be inseparable, that any of them are used in a destructive way the dangerous impact may be reinforced by the very closeness of their association with other systems. As a result, we need much more sophisticated estimates of the degrees and varieties of environmental insult. We may find ourselves reducing pollution in one area only to find that the other life systems are endangered still more.

In cities and industrialised areas, pollution of air and water

is a matter of great concern with the advent of more automobiles, more industries, more power stations, the basic grids of the biosphere are endangered. And in this process of pollution, the so-called modern agriculture also plays a part.

Few people suspected in 1950s that substance such as DDT had the same capacity as such well recognised metallic poisons as mercury to become more steadily concentrated as they moved up each stage of the food chain. Fish eaten by the birds can thus be passing on concentrations which, by hidden degrees, have already passed beyond the bird's tolerance to DDT. The poison is further concentrated in their organisms and either they cease to reproduce or lay eggs too thinly shelled for hatching.

Then we find the bewildering degree of interdependence of natural systems. Toxic materials cannot be put into either air, water or soil without their re-appearing in the other two. This interdependence extends to the creatures living in the three elements. At one time, it seemed reasonable to souse large areas in the Southern parts of United States with lethal mixture of dieldrin and heptachlor, two of the most poisonous chlorinated hydro-carbons, in order to eradicate the fire ant. The poisons were applied at the rate 2 lbs/acre. The fire ant survived. A very wide variety of other species decimated. It was at this point that the question began to be more widely raised whether, by indiscriminate killing, another of nature's delicate balances might be destroyed — the balance between the pests and the other

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creatures in nature which play upon them. Suddenly eradicate one predator from the food chain and it may be found that a population explosion of another pest occurs at another point along the chain.

Another important aspect of the complexity is nature's inexhaustible variety — of soil, of climate, of species, of plants. This is indeed the glory of man's natural environment and one of the dangers of monotonous and undifferentiated urbanization is the tendency to standardization and uniformity which can be a cultural blight on the human psyche. But in nature, standardization, in the sense of uniform treatment for uniform conditions can be more than a blight. It can be literally a killer. Doses of insecticides or pesticides which are correctly balanced for one kind of air condition, climate, soil and plant ecology can be lethal in neighbouring conditions or even in the same condition on a more or less windy day. It is perhaps here, more clearly than anywhere else, that we see the dangers of any oversimplified acceptance of science's essential techniques of abstraction and generalization. In a range of inorganic and man-made things, laws of measurement, stress, balance force and counter force all hold good. But one of the essential points about agriculture is that much of its fertility range and resilience depends precisely upon its lack of uniformity. Unless the effects of attempted standardisation, for instance in monocultures, are purposefully offset by man—induced variety, fertility can be endangered.

USE OF PESTICIDES

Pesticide can be highly toxic and short-lived. The organophosphates malathion and parathion belong to this group. They last only a month or two but are quite indiscriminate killers. Some pesticides are toxic and last so long that they have cumulative effects and as a result generate a whole variety of delayed consequences which can be difficult to predict. This is the problem with the chlorinated hydrocarbons, all of which—DDT and, more lethally, dieldrin and endrin—accumulate along the food chains overtime in increasingly concentrated forms. They also allow insects enough time to develop immunity to them and return with a tolerance or even a positive affinity for the more widely used hydrocarbons.

Finally, the pesticides can be highly toxic and virtually permanent. These are the non-degradable ones—for instance all the various compounds of mercury arsenic and lead.

Regarding a general pattern of use of these different varieties of pesticides, there is no doubt that it is suicidal to use non-degradable ones.

Biological control of pests is an alternative to the use of chemicals. But they have to be used with more caution than the chemicals. A mutant strain running out of control could be more formidable danger than chemical elimination of a single species. Yet they may also turn out to be much more specific than organic synthetic pesticides. The screw-worm fly which infects cattle has, for instance,

been controlled by eradicating male flies and rendering them sterile.

Another possibility is the introduction of a specific predator to attack a particular plant or animal pest. This can be risky sometimes. A predator or virus brought into cure one evil may set off a dozen others. The more specific the interrelationship between the predator and prey the safer the experiment.

It is possible to exert, in certain cases, biological control if there is sufficient knowledge on the life pattern of both insects and plants. Crops can be chosen and planted in such a way that they can be harvested before the expected onslaught of local insects or microbes.

So far, the most effective type of biological control has been the development of strains resistant to local pests and diseases.

In this type of research, the airs and winds, the cycles of vegetation, the rainfall, the soil types, the natural predators and their place in the natural food chains—all have to be fully understood. Techniques of pest control, whether chemical or biological can be safely used only within the context of such knowledge. Aerial spraying over vast acreages with lasting lethal poisons lies at exactly the opposite pole from this careful, watchful, respectful approach to nature's own complexity and from the attempt to find out control measures that match. To minimise strain on the ecosystem and thus to avoid disastrous consequences by our modern farming system, vigorously researched

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approach to the realities and interactions of air and climate, or water and soil and plant is needed.

FARMING IN TROPICS RISKY

Farming in tropical and sub-tropical areas cause a wider range of environmental risks than in the climate of temperate lands. In contrast to the gentle, steady and year-round rains of temperate regions, rains come with the force of inundation in tropical climate. The heavy rains are followed by long period of dry season with temperature rising above 100°F in certain regions. Under these conditions, the soil in these regions could be irretrievably damaged within a few centuries or even decades if the present irrational mining of soil is continued. The widely adopted monoculture system in agriculture with heavy use of fertilizers and indiscriminate use of plant protection chemicals is also a matter for profound anxiety.

Rotation, varieties of seed, different types of crops planted in alternative belts etc. can all lessen undoubted risks of monoculture. A judicious introduction of woods and lines of trees as windbreaks which encourage evaporation and vary the region's land and insect life has been found in parts of Europe to increase fertility sufficiently to offset any loss of arable land. Science can be used to re-create complexity even in apparent monocultures. In the great plains of Western Canada, annual variations in seeds and types of plants coupled with a careful attention to the limiting of farm operations, lessen the

risk of mounting attacks by predators or pests on a single repeated crop.

OCEANS AND THEIR IMPORTANCE

No place on earth is free from pollution. Even the vast oceans which was once considered non-pollutable because of the vastness are being polluted and cause serious repercussions on the man's destiny. According to some marine biologists the oceans are the most immediately threatened part of the biosphere.

Only the fact that so much of the surface of our planet is composed of water makes it habitable. It is the oceans that provide the water vapour which drawn up by the sun, falls upon the earth in harvest—bringing, life sustaining rain. Ocean water is our planet's filtering system where all debris both mineral and biological is dissolved, decomposed and transformed into life-supporting substances. It is a major provider of the oxygen released by its phytoplankton for the benefit of all the species of land air and sea—breathing with lungs and gills. Without water's special qualities for holding heat much of earth would be uninhabitable. The oceans are the coolants of the tropics, the bringers of warm currents to cold regions, the universal moderators of temperature throughout the globe.

Domestic sewage, industrial wastes and fertilizers and pesticides washed down from the agricultured lands reach the ocean. Offshore drilling and sea transport of oil are other major sources of pollution. At present,

only 17 per cent of the world's oil supplies come from offshore drillings. By 1980, offshore production is expected to rise to 50 per cent of the oil produced from all sources in 1970. Such rapid expansion carries with it a danger of more frequent spills, more fouled beaches, more depletion of estuarine hatcheries, more birds and fish dead on the slicks of oil.

Another matter for alarm is the use of oceans for the disposal of radioactive wastes.

WILDERNESS

In the attempt to provide more food for the rapidly increasing population, it was the forests that were very much affected. Forests are to be protected and preserved as they are closely linked with the climatic and environmental stability. They are needed to complete our still patchy knowledge of the interdependence of living things and the underlying balances of our natural order not yet disturbed by man. They are needed to preserve the images of variety in plant and animal without which the human imagination could easily become a starveling.

SOLUTION

The environmental problems are becoming increasingly worldwide and therefore a global approach is needed. There is worldwide acceptance on the need for more thought and action on this problem. The establishment of a desirable human environment implies more than the maintenance of ecological equilibrium, the economic management of natural resources, and the control

(Continued on Page 34)

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Evaluation of oil percentage in different varieties\types of cardamom

India is the biggest producer of cardamom. The export of cardamom has crossed 2700 M.T. valued at Rs. 48 crores in 1977-78. The cardamom oil is mainly derived from the seeds and it is used in the food and pharmaceutical industry. At present, very little cardamom oil is distilled within India. A large number of varieties of cardamom are known in trade and the oils from these varieties have characteristically different flavours. The present study aims at a comparison of the average oil percentage in different varieties/types of cardamom.

The capsules of three different varieties of cardamom (*Elettaria cardamomum*), viz. Malabar (Prostrate), Mysore (Erect) and Vazhukka (Semi-erect) and eleven distinct types, viz. Ceylon, Hema, Malai, Ceylon-Semi-erect, APG, C1-53, C1-54, C1-37, C1-1228, C1-1258 and C1-1259 were selected for oil analysis. The well ripened capsules harvested from each type were uniformly mixed and subjected to flue-curing. At random, 100 g. of capsules were selected for carrying out oil analysis. The oil analysis was carried out at C.S.I.R.'s Trivandrum complex. The seeds obtained from the dehusked capsules of each variety were mildly crushed in a waring blender, and 25 g. material of each variety was distilled for 30 minutes and

the oil content determined by using the Clevenger trap.

The oil contents of different varieties/types of cardamom are presented in the Table-1. It can be seen from the Table that the varieties 'Mysore' and 'Vazhukka' contain the highest percentage of oil (8.0) each, and the lowest percentage of oil (6.4) was recorded in Malai, APG and C1-1259. In general, the percentage by weight of cardamom seeds in the capsules ranged from 68 to 75. Percentage of cardamom seeds is positively correlated

($r = 0.4365$) with the volatile oil V/W on dry seed basis; whereas the percentage of husk to volatile oil is negatively correlated ($r = -0.4365$).

In India, the spice extraction industry has bright prospects. Most of the spices are exported in bulk which involve heavy expenditure towards handling and freight charges. It is reported that cardamom oil has made a breakthrough in the export front. It is also fetching remunerative prices conducive to the growth of cardamom oil extraction industry,

TABLE-I
Analysis of Cardamom samples

Sl. No.	Samples	Cardamom capsules		Volatile oil % V/W on dry seed basis
		Seed %	Husk %	
1.	Mysore	68	32	8.0
2.	Vazhukka	69	31	8.0
3.	Hema	70	30	7.6
4.	Malabar	68	32	7.6
5.	Ceylon-Semi-erect	62	38	7.6
6.	C1-1258	73	27	7.5
7.	Ceylon-Erect	69	31	7.2
8.	C1-54	69	31	7.2
9.	C1-37	69	31	7.2
10.	C1-1228	75	25	7.2
11.	C1-53	68	32	6.8
12.	Malai	72	28	6.4
13.	APG	70	30	6.4
14.	C1-1259	71	29	6.4

i.e. Rs. 2,400 to 2,800 per kg. In the light of the present studies, it appears that greater attention

has to be paid towards the selection of clones for higher percentage of volatile oil.

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2. Anonymous 1978. Breakthrough in cardamom oil export. Cardamom, 10 (2): 30
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4. The Wealth of India. 1952. Vol. III, CSIR, New Delhi, p. 158.

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Indian Cardamom Research Institute, Myladumpara,
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Sealed tenders superscribed 'Tender No. E/T-1' from experienced contractors for the following works by the undersigned.

Sl.	Name of work	Place of work	PAC	EMD	Type of Contract	Cost of documents	period of completion
			Rs.	Rs.		Rs.	
1.	Construction of a pond for sprinkler irrigation	ICRI Estate, Myladumpara	37,000/-	750/-	Item rate	10/-	1 month
2.	Construction of a pond for potable water	„	31,000/-	600/-	„	„	„
3.	Construction of a drainage channel	„	4,970/-	100/-	„	5/-	2 weeks
4.	Construction of earthen road(Jeepable) approximate 6 km length	„	76,000/-	1,500/-	„	25/-	2 months

The last date for the receipt of tenders is 3 p.m. on 5-3-1979.
Time of opening the tender - 4 p.m. on 5-3-1979.

The tender forms will be available from the above office from 10-1-1979 onwards.

No. E/T-1
5th February 1979.

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FARM MANAGER

Our Environment

(Continued from Page 31)

of the forces that threaten biological and mental health. Ideally, it requires also that social groups and individuals be provided with the opportunity to develop ways of life and surroundings of their own choice. Man not only survives and functions in his environment, but also shapes it and is shaped by it. As a result of this constant feedback between man and environment, both acquire distinctive characteristics which develop within the laws of nature, yet transcend the blind determinism of natural phenomena. The exciting richness of the human environment results not only from the immense diversity of genetic constitution and of natural phenomena but also, perhaps even more, from the endless interplay between natural forces and human will.

There is no need for despair. Some nations have already taken up effective pollution control programmes. Already some cities enjoy cleaner air than they knew three or four decades ago. Rivers are being cleaned up and fish are returning to them. There are places, where range lands are managed properly, where soil erosion has been stopped, wild life is preserved and timber land carefully reforested. □

(Condensed by Shri P. K. Zachariah, Soil Chemist, Cardamom Board, Cochin-18)

Sales and Prices at Cardamom Auctions

NOVEMBER 1978

NOVEMBER 1977

Centre	Date	Sales (kgs.)	Rate		Rs. / kg.	Date	Sales (kgs.)	Rate		Rs. / kg.
			Max	Min.				Av.	Max.	
KERALA										
Vandanmettu	4-11-78	52902	222.90	44.00	190.29	1-11-77	48512	190.10	70.90	151.32
	7-11-78	34985	229.10	40.00	188.53	5-11-77	73220	200.00	43.10	150.63
	11-11-78	48407	230.00	43.00	188.19	8-11-77	50948	201.10	70.00	153.60
	14-11-78	32835	210.50	82.00	184.14	12-11-77	45000	189.60	60.60	150.12
	18-11-78	56284	219.00	67.00	177.57	15-11-77	21602	176.20	46.10	140.35
	21-11-78	33130	207.00	104.00	180.00	19-11-77	36906	199.00	60.10	143.18
	25-11-78	37623	224.90	67.00	185.01	23-11-77	21337	192.90	70.10	159.03
	—	—	—	—	—	26-11-77	54957	207.00	67.50	155.83
	—	—	—	—	29-11-77	35794	209.10	75.10	152.84	
Udumbanchola	3-11-78	4616	197.00	124.00	175.30	4-11-77	4096	160.00	75.50	141.09
	3-11-78	1205	194.10	159.10	178.88	4-11-77	2865	160.60	75.00	140.96
	10-11-78	2692	198.00	75.10	177.37	11-11-77	2857	161.00	80.10	144.64
	10-11-78	372	197.30	17.00	185.74	11-11-77	1674	166.90	83.10	152.43
	11-11-78	4096	188.00	123.00	168.12	18-11-77	1881	160.00	71.00	128.96
	17-11-78	956	179.00	139.10	164.25	18-11-77	1736	145.30	54.90	117.44
	24-11-78	2661	200.10	136.00	175.21	25-11-77	2503	165.10	81.50	143.31
	24-11-78	927	189.90	39.00	170.54	25-11-77	2255	168.00	49.50	139.30
Santhanpara	2-11-78	11982	216.00	35.10	178.82	3-11-77	10407	165.00	62.90	132.35
	6-11-78	8046	209.20	2.00	174.99	7-11-77	4215	161.50	20.00	141.95
	9-11-78	11599	220.10	27.10	171.56	10-11-77	4657	163.20	78.90	136.81
	13-11-78	6616	199.90	37.00	172.66	14-11-77	1665	163.10	71.70	130.47
	16-11-78	12755	217.90	35.00	172.41	17-11-77	2210	160.10	73.30	117.53
	20-11-78	8355	190.00	21.00	164.12	21-11-77	3683	165.10	85.40	133.70
	23-11-78	9518	216.50	62.20	169.34	24-11-77	4211	166.80	58.00	132.66
	27-11-78	8248	219.00	19.50	171.94	28-11-77	3677	161.10	68.30	135.58
30-11-78	15535	219.10	32.00	179.95	—	—	—	—	—	
Kallar	1-11-78	6763	196.00	22.10	163.02	2-11-77	9007	155.50	69.10	126.48
	8-11-78	5809	188.00	103.90	168.25	16-11-77	6783	152.00	41.00	120.40
	15-11-78	7803	188.00	112.10	162.89	23-11-77	4609	155.80	27.10	120.84
	15-11-78	13802	226.50	129.10	169.34	30-11-77	6106	164.50	42.00	132.24
	22-11-78	4711	181.90	35.30	155.91	—	—	—	—	—
	22-11-78	3894	207.00	25.40	159.95	—	—	—	—	—
	29-11-78	5050	188.00	67.00	156.08	—	—	—	—	—
	29-11-78	4777	190.50	26.30	165.02	—	—	—	—	—
Parathodu	1-11-78	2958	205.10	125.10	190.64	—	—	—	—	—
	5-11-78	3041	199.00	71.10	177.96	—	—	—	—	—
	12-11-78	3895	197.10	40.10	171.07	—	—	—	—	—
	19-11-78	4432	184.60	126.90	167.28	—	—	—	—	—
	26-11-78	3202	195.00	131.20	180.45	—	—	—	—	—

SALES AND PRICES AT

NOVEMBER 1978

NOVEMBER 1977

Centre	Date of auction	Sales (kgs.)	Rate (Rs./kg.)			Date of auction	Sales (kgs.)	Rate (Rs./kg.)		
			Maxi- mum	Mini- mum	average			Maxi- mum	Mini- mum	average
Cochin	3-11-78	3597	220.00	156.50	184.57	28-11-77	4856	185.00	64.20	143.00
	10-11-78	1904	235.10	100.10	160.35	—	—	—	—	—
	17-11-78	821	195.00	144.00	176.40	—	—	—	—	—
TAMILNADU										
Pattiveeranpatty	5-11-78	4641	205.00	125.00	150.97	6-11-77	6585	180.00	45.00	115.70
	12-11-78	5859	202.60	100.00	154.80	13-11-77	3513	174.60	50.20	102.00
	19-11-78	3709	197.10	64.10	144.24	20-11-77	3987	140.00	70.00	102.80
	26-11-78	8298	203.00	125.00	158.99	27-11-77	4189	155.10	65.50	106.70
Bodinayakanur	3-11-78	199	171.10	16.40	139.42	—	—	—	—	—
	17-11-78	172	166.00	19.00	142.20	—	—	—	—	—
	24-11-78	400	171.00	20.20	146.63	—	—	—	—	—
KARNATAKA										
Mercara	3-11-78	36	186.00	144.00	148.38	4-11-77	1028	118.00	65.50	93.00
	24-11-78	1189	152.00	132.50	140.00	—	—	—	—	—
Mangalore	8-11-78	5251	156.50	130.00	145.00	2-11-77	5115	124.50	62.00	95.00
	13-11-78	100	140.25	140.25	140.25	14-11-77	535	113.50	30.00	85.00
	20-11-78	728	155.00	10.00	147.00	28-11-77	364	116.50	63.10	90.00
	22-11-78	5075	171.00	133.00	143.00	28-11-77	1111	122.60	40.00	110.40
	—	—	—	—	—	30-11-77	9310	148.79	76.00	105.00
Sirsi	1-11-78	558	138.89	50.89	115.02	—	—	—	—	—
	8-11-78	476	140.77	80.77	128.90	—	—	—	—	—
	15-11-78	695	148.99	65.44	130.06	—	—	—	—	—
	22-11-78	633	140.07	67.00	129.97	—	—	—	—	—
	29-11-78	420	152.09	66.00	126.50	30-11-77	397	126.77	43.26	84.72
Saklaspur	—	—	—	—	—	—	—	—	—	—
	2-11-78	1122	158.00	88.00	135.47	1-11-77	10440	135.10	70.00	91.84
	2-11-78	8913	158.00	96.50	140.63	1-11-77	701	115.30	84.70	94.18
	2-11-78	801	155.00	127.10	139.05	2-11-77	3123	158.00	69.00	89.35
	4-11-78	1111	160.00	86.10	137.76	2-11-77	807	151.00	40.10	92.20
	4-11-78	1395	160.00	123.10	139.64	3-11-77	6313	142.00	63.10	93.35
	7-11-78	10335	238.00	87.00	144.66	5-11-77	1494	160.10	55.90	91.75
	8-11-78	1933	163.10	77.10	130.50	8-11-77	223	135.10	76.30	92.13
	8-11-78	1209	165.00	80.00	129.02	8-11-77	7967	151.00	73.00	92.92
	9-11-78	9179	152.50	101.00	134.90	9-11-77	1802	157.30	72.20	88.55
	11-11-78	1369	151.00	87.00	135.56	9-11-77	651	140.50	41.00	90.95
	14-11-78	10150	230.00	95.00	141.43	10-11-77	3294	129.00	65.00	94.60
	15-11-78	1621	160.00	80.10	133.33	12-11-77	1360	155.00	68.00	92.13
	15-11-78	1565	164.00	88.10	133.85	12-11-77	966	158.00	73.00	90.88

CARDAMOM AUCTIONS

NOVEMBER 1978

NOVEMBER 1977

Centre	Date of auction	Sales (kgs.)	Rate (Rs./kg.)			Date of auction	Sales (kgs.)	Rate (Rs./kg.)		
			Maxi-mum	Mini-mum	average			Maxi-mum	Mini-mum	average
Saklespur	16-11-78	7753	158.00	100.00	136.56	15-11-77	7626	153.00	70.50	89.25
	18-11-78	1897	155.10	70.00	134.60	15-11-77	635	144.50	15.50	93.44
	21-11-78	6858	220.00	90.00	140.50	16-11-77	918	142.00	73.90	92.17
	22-11-78	1010	160.00	88.60	129.44	16-11-77	1662	141.10	56.00	88.00
	22-11-78	2379	156.00	81.00	130.00	17-11-77	4994	150.00	60.00	89.81
	23-11-78	6457	170.10	80.00	132.50	19-11-77	877	150.20	75.00	83.08
	28-11-78	5667	155.00	87.00	133.98	22-11-77	9542	163.10	72.40	92.88
	29-11-78	1214	152.00	80.00	129.97	22-11-77	308	105.00	70.10	92.83
	29-11-78	1537	152.80	83.60	126.70	23-11-77	597	131.00	59.00	86.13
	30-11-78	6816	162.30	87.00	134.47	23-11-77	1130	137.80	75.40	88.71
	—	—	—	—	—	24-11-77	6729	150.10	65.00	96.66
	—	—	—	—	—	26-11-77	1015	150.20	75.00	91.18
	—	—	—	—	—	26-11-77	1079	125.95	70.10	92.30
	—	—	—	—	—	29-11-77	1165	185.00	55.00	97.16
	—	—	—	—	—	29-11-77	1469	150.00	76.90	95.08
	—	—	—	—	—	30-11-77	2694	150.00	73.50	94.10
	—	—	—	—	—	30-11-77	1088	148.10	65.00	97.91
Mudigere	6-11-78	674	146.70	123.00	133.61	—	—	—	—	—
	13-11-78	1407	159.00	115.10	132.33	—	—	—	—	—
	20-11-78	1387	153.20	118.50	128.68	—	—	—	—	—
	27-11-78	1665	155.40	114.00	127.50	—	—	—	—	—

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6. Potassium Chlorate
7. Sodium Chlorate.

SALES AND PRICES AT

DECEMBER 1978

DECEMBER 1977

Centre	Date	Sales (kgs.)	Rate Rs. / kg.			Date	Sales (kgs.)	Rate Rs. / kg.		
			Max.	Min.	Av.			Max.	Min.	Av.
Vandanmettu	2-12-78	57411	215.20	47.10	186.05	3-12-77	50306	210.00	70.00	154.7
	5-12-78	27428	215.10	50.30	179.78	6-12-77	25195	216.00	77.90	155.0
	9-12-78	40337	236.10	80.00	177.83	10-12-77	46880	217.60	56.00	163.7
	12-12-78	41797	221.00	70.00	178.66	13-12-77	32026	198.00	60.00	165.4
	16-12-78	68683	227.10	51.20	181.55	17-12-77	43403	220.10	65.90	169.9
	—	—	—	—	—	20-12-77	18991	252.10	64.10	162.3
	—	—	—	—	—	24-12-77	32469	215.10	77.90	159.8
	—	—	—	—	—	27-12-77	14200	195.20	79.50	154.8
Udumbanchola	—	—	—	—	—	31-12-77	23592	224.10	71.00	163.5
	1-12-78	6372	199.10	121.00	180.75	2-12-77	2884	156.90	86.20	143.4
	—	—	—	—	—	2-12-77	3663	167.80	83.00	138.8
	8-12-78	3552	184.10	101.00	150.69	9-12-77	4159	164.00	70.10	141.5
	8-12-78	653	181.10	130.90	163.17	9-12-77	5113	190.00	99.80	145.9
	15-12-79	4554	190.60	32.00	165.45	16-12-77	2628	170.00	85.95	146.8
	15-12-78	599	179.90	115.00	165.70	16-12-77	5334	192.10	81.00	150.1
	22-12-78	5467	195.00	114.00	159.20	23-12-77	2784	193.10	55.00	151.9
Santhanpara	29-12-78	1898	185.00	120.10	161.86	23-12-77	4585	210.00	107.10	161.9
	—	—	—	—	—	30-12-77	1267	173.90	76.10	151.8
	—	—	—	—	—	30-12-77	1772	168.70	94.80	148.5
	4-12-78	6743	196.20	44.10	170.89	1-12-77	4899	185.00	36.40	132.7
	7-12-78	10311	212.00	22.00	168.97	5-12-77	6458	168.00	5.00	116.6
	10-12-78	8189	187.60	7.70	160.68	8-12-77	5642	170.20	54.10	130.0
	14-12-78	8185	216.60	110.80	166.72	12-12-77	2904	169.60	81.20	137.4
	18-12-78	4182	186.10	32.10	167.48	15-12-77	4349	168.20	104.00	144.1
Kallar	21-12-78	10622	214.50	30.10	160.32	19-12-77	1267	172.10	50.00	144.4
	28-12-78	8570	223.30	30.00	166.73	22-12-77	4425	210.10	78.20	151.9
	—	—	—	—	—	26-12-77	1372	175.00	5.00	128.3
	—	—	—	—	—	29-12-77	1181	164.90	92.20	141.2
	6-12-78	5434	180.20	80.10	150.81	7-12-77	7246	168.90	72.00	135.7
	6-12-78	6924	185.30	123.90	159.49	14-12-77	7003	166.10	55.20	135.3
	13-12-78	5581	189.20	80.90	154.90	—	—	—	—	—
	20-12-78	6462	181.60	20.90	154.55	—	—	—	—	—
Cochin	27-12-78	1617	177.00	68.00	149.47	—	—	—	—	—
	1-12-78	4553	230.10	124.20	164.76	5-12-77	3359	171.10	60.50	137.8
	8-12-78	2393	211.30	113.00	174.74	12-12-77	2824	170.20	83.00	131.4
	15-12-78	1895	196.90	111.00	160.84	19-12-77	1890	187.80	76.90	143.2
Parathodu	—	—	—	—	—	28-12-77	2069	176.50	68.20	132.2
	3-12-78	7392	192.10	85.60	173.03	—	—	—	—	—
Pattiveeranpatty	3-12-78	6780	202.50	70.00	154.95	4-12-77	3812	177.10	52.00	109.2
	10-12-78	2904	169.20	91.00	132.70	11-12-77	6429	187.00	100.00	131.6
	17-12-78	5246	200.00	135.00	147.27	18-12-77	5258	199.50	76.00	144.7
	24-12-78	5046	230.00	85.10	155.65	25-12-77	4134	193.00	70.20	127.4
	31-12-78	2264	194.50	99.40	130.96	30-12-77	5429	192.00	90.00	136.0
	—	—	—	—	—	—	—	—	—	—

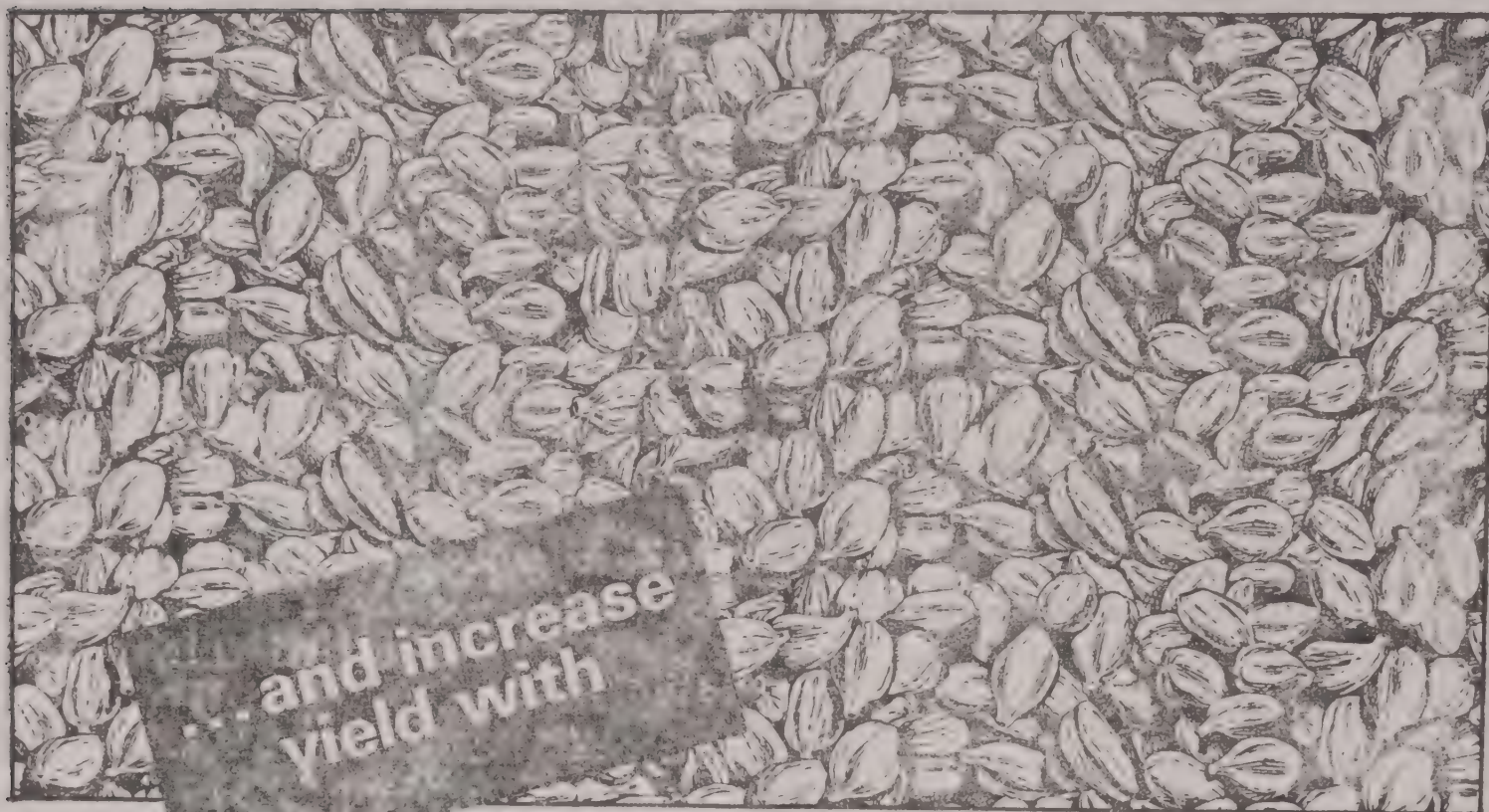
CARDAMOM AUCTIONS

DECEMBER 1978

DECEMBER 1977

Centre	Date	Sales (kgs.)	Rate Rs. / kg.			Date	Sales (kgs.)	Rate Rs. / kg.		
			Max.	Min.	Av.			Max.	Min.	Av.
Bodinayakanur	1-12-78	357	177.20	30.10	151.66	—	—	—	—	—
	8-12-78	513	166.10	22.10	125.96	—	—	—	—	—
	15-12-78	418	169.10	34.10	133.04	—	—	—	—	—
	22-12-78	1140	176.10	32.10	150.19	—	—	—	—	—
	29-12-78	2545	185.00	23.30	138.21	—	—	—	—	—
Mercara	1-12-78	56	150.00	145.00	148.00	2-12-77	1550	150.00	80.00	113.00
	8-12-78	38	150.00	150.00	150.00	30-12-77	1681	150.00	70.50	111.84
	29-12-78	305	145.50	133.00	136.50	—	—	—	—	—
Mangalore	18-12-78	275	147.50	10.50	128.00	8-11-77	63	137.00	10.10	101.98
	—	—	—	—	—	14-12-77	8590	155.50	69.00	120.00
	—	—	—	—	—	22-12-77	15	110.10	50.00	97.97
	—	—	—	—	—	26-12-77	348	123.00	95.00	117.42
Sirsi	6-12-78	635	136.86	70.00	125.53	7-12-77	1556	107.00	79.86	91.00
	13-12-78	482	138.79	70.00	126.76	14-12-77	425	129.75	65.89	97.75
	20-12-78	336	130.79	60.79	119.30	21-12-77	432	112.92	45.76	103.25
	27-12-78	99	134.89	62.26	122.98	28-12-77	245	115.65	68.56	101.73
Mudigere	4-12-78	1233	150.00	113.70	129.96	—	—	—	—	—
	11-12-78	286	140.00	105.10	114.83	—	—	—	—	—
Saklasapur	2-12-78	723	139.10	121.70	128.03	1-12-77	8560	146.00	70.00	100.87
	2-12-78	1488	160.40	62.00	127.30	3-12-77	2328	139.10	50.00	96.12
	5-12-78	6332	537.00	86.00	128.86	6-12-77	9144	190.00	65.10	101.95
	6-12-78	376	159.10	79.00	125.84	6-12-77	1408	154.00	87.90	98.09
	6-12-78	1524	150.00	83.00	120.20	7-12-77	1374	158.50	80.00	97.88
	7-12-78	8516	145.00	70.00	125.55	7-12-77	2246	156.00	76.00	97.85
	9-12-78	562	140.20	80.10	116.61	8-12-77	9276	140.00	78.00	105.25
	12-12-78	6878	231.00	61.00	125.74	10-12-77	888	151.00	76.40	99.05
	13-12-78	1357	141.10	48.00	117.50	10-12-77	1186	163.80	88.40	103.00
	14-12-78	4071	155.00	87.70	119.75	13-12-77	15233	206.00	72.10	108.07
	15-12-78	1404	155.00	90.00	119.64	13-12-77	1392	164.00	89.00	103.12
	16-12-78	666	139.00	89.00	115.35	14-12-77	2506	161.80	80.00	104.12
	19-12-78	7088	179.10	90.10	124.10	14-12-77	1330	162.10	80.00	111.35
	20-12-78	1812	156.00	88.30	113.75	15-12-77	8962	165.00	75.00	115.26
	22-12-78	1601	156.90	64.10	117.96	17-12-77	1169	157.00	82.00	110.28
	23-12-78	872	148.00	85.50	117.59	20-12-77	10239	173.00	79.50	113.83
	26-12-78	5216	152.50	80.00	114.18	20-12-77	1794	160.10	93.00	106.01
	27-12-78	1864	167.10	79.00	114.10	21-12-77	3170	167.00	101.00	116.10
	28-12-78	7167	166.00	55.00	105.50	21-12-77	2208	169.00	82.00	111.77
	—	—	—	—	—	22-12-77	7164	160.00	83.00	117.20
	—	—	—	—	—	24-12-77	900	172.00	82.80	116.99
	—	—	—	—	—	27-12-77	5773	165.00	70.10	113.37
	—	—	—	—	—	28-12-77	1164	161.00	85.10	108.72
	—	—	—	—	—	28-12-77	1001	156.60	85.00	106.80
	—	—	—	—	—	29-12-77	4409	155.00	86.00	114.80

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PRODUCTION

Production of cardamom for 1978-79 season is estimated as follows:

State	Production (M.T.)
Kerala	2900
Tamilnadu	300
Karnataka	800
Total	4000

SALES AND PRICES AT AUCTIONS

Centre-wise sales and weighted average prices at auctions during December 1978 and December 1977 are given below:

The cumulative position of sales and prices during August-December 1978 compared to August, December 1977 is given in Table 2.

TABLE 1

Centre	1978 CROP (Current Season)		1977 CROP (Last Season)	
	DECEMBER 1978		DECEMBER 1977	
	Quantity (kgs.)	Average price (Rs./kg.)	Quantity (kgs.)	Average price Rs./kg.
KERALA				
Vandanmettu	235626	181.29	287091	161.54
Santhanpara	56802	165.61	32497	133.28
Udumbanchola	23095	165.57	34191	148.19
Kailar	26018	154.84	14249	135.56
Cochin	8841	166.62	10142	135.91
Parathode	7392	173.03	—	—
Total (Except Vandanmettu)	122148	163.83	91079	139.53
Total (Kerala)	357774	175.33	378170	156.24
TAMILNADU				
Pattiveeranpatti	22240	149.22	20633	129.66
Bodinayakanur	4973	140.22	—	—
Total (Tamilnadu)	27213	147.58	20633	129.66
KARNATAKA				
Mercara	399	139.45	9371	113.71
Mangalore	275	128.00	9016	119.74
Saklespur	56086	120.30	101278	108.86
Sirsi	1552	124.39	1658	96.73
Mudigere	1519	127.11	—	—
Total (Karnataka)	59831	120.74	121323	109.88
Grand Total (India)	444818	166.29	520126	144.37

Production and Exports

In Kerala 358 M.T. were sold as against 378 M.T. during December 1977. While observing the centre-wise sales in Kerala during December 1978 it could be seen that though the sales at Vandanmettu were less by 51 M.T. compared to previous year, the sales at other centres in Kerala were more by 32 M.T. The lower sales at Vandanmettu during the month was due to the suspension of auctions at Vandanmettu during the second fortnight of the month. However, we have more sales during January 1979. In Tamilnadu 27 M.T. were sold during December 1978 as against 21 M.T. during December 1977. In Karnataka, as per reports received so far, auction sales were less by 61 M.T. during December 1978 compared to previous year. This will have to be revised on receipt of complete reports from that region.

The cumulative position of auction sales during the current season as on 31st December 1978 was comparatively less than that of previous year. The sales in Kerala during the current season (as on 31st December 1978) is 1824 M.T. as against 1887 M.T. sold during the same period of the previous year. In fact the lower sales during the period August-December of current

Table 2

Centre	1978 CROP (Current Season)		1977 CROP (Last Season)	
	AUGUST-DECEMBER 1978		AUGUST-DECEMBER 1977	
	Quantity (kgs.)	Average price (Rs./kg.)	Quantity (kgs.)	Average price (Rs./kg.)
KERALA				
Vandanmettu	1126721	190.53	1478585	146.43
Santhanpara	373340	176.45	171333	127.59
Udumbanchola	96310	175.14	101386	137.85
Kallar	152652	166.22	110913	121.45
Cochin	22499	175.28	25293	128.95
Parathode	52555	180.06
Total (Except Vandanmettu)	697356	174.26	408925	128.43
TOTAL (KERALA)	1824077	184.31	1887510	142.53
TAMILNADU				
Pattiveeranpatty	79882	153.53	79821	111.80
Bodinayakanur	9685	147.05
Total (Tamilnadu)	89567	152.83	79821	111.80
KARNATAKA				
Saklespur	275958	137.74	305736	99.50
Mercara	16423	147.40	64259	96.42
Mangalore	21353	145.69	34738	104.07
Sirsi	7637	129.11	2055	94.45
Mudigere	14945	134.56
Total (Karnataka)	336316	138.38	406788	99.38
Grand Total (India)	2249960	176.19	2374119	134.10

season is due to the suspension of auctions at Vandanmettu during the second half of December 1978. However, during January 1979 more sales were effected at Vandanmettu as well as in other centres. The position as on 17th January 1979 is given in table 3.

The latest position of auction sales given in table 3 indicates that the sales in Kerala during the current season is more by over 100 M.T. than that of the previous year. In the light of the above facts we expect that current year's crop in Kerala will not be less

than that of last year i.e. 2900 M.T. In Tamilnadu also the crop is estimated to be equal to that of previous year. The total crop in Karnataka is expected to be around 800 M.T. during the current year.

The weighted average price fetched at Vandanmettu during December 1978 was Rs. 181/- per kg. as against Rs. 161/- per kg. during December 1977. However the reports for January 1979 indicate that the price in Vandanmettu has come down to Rs. 173/- per kg. At Santhanpara the average price realised was Rs.

166/- per kg. during December 1978 as against Rs. 133/- per kg. during December 1977. As a whole the average price realised in Kerala was Rs. 175/- per kg. during December 1978 as against Rs. 156/- per kg. during December 1977. The average prices in Tamilnadu and Karnataka during December 1978 were Rs. 148 per kg. and Rs. 121 per kg. as against Rs. 130 per kg. and Rs. 110/- per kg. during December 1977 respectively.

EXPORTS

As per the reports from the Customs Authorities the export of cardamom during December 1978 was 566 M.T. worth Rs. 12.1 crores as against 546 M.T. valued at Rs. 9.77 crores during December 1977. The unit export price realised during December 1978 was Rs. 215.39 per kg. as against Rs. 178.98 per kg. during December 1977. Out of this 566 M.T. of exports during December 1978, we have received details for 419 M.T. worth Rs. 8.99 crores from the exporters of Cardamom. The exporters have been reminded to send the details of exports of the remaining quantity of 147 M.T.

MONTH-WISE EXPORTS OF CARDAMOM

Month/wise export of cardamom during the current year compared to the previous year are given in table 4.

It could be seen from the above statement that the total exports during the period April-December 1978 was 1705 M.T. with earnings of Rs. 34.28 crores. The exports during the same period of the previous year was 2077 M.T. worth Rs. 36.30

TABLE 3

Centre	1978 CROP(Current Season)		1977 CROP(Last year)	
	August 1978-17th		August 1977-17th	
	January 1979		January 1978	
	Quantity (Kgs.)	Average Price Rs./kg.)	Quantity (Kgs.)	Average Price (Rs./kg.)
Vandanmettu	1313660	188.08	1532853	146.72
Other Centres in Kerala	748155	172.91	423752	128.62
Kerala (Total)	2061815	182.58	1956605	142.80
Tamilnadu	98277	151.81	91611	114.38
Karnataka	397908	137.33	443630	101.05
Grand Total (India)	2558000	174.36	2491846	134.32

crores. The unit value realised during the current year was Rs. 201.10 per kg. as against Rs. 174.77 per kg. during last year. The shortfall in earnings is only around Rs. 2 crores. The dock labour strike in November 1978 partially caused the decline in exports during November 1978. Considering the present higher price compared to the previous year, the annual average export price during the current financial year is expected to be not less than Rs. 200/-per kg. as against Rs. 175/-per kg. during last year. Thus even if the total quantity exported remained at the level of 2600 M. T., the total earnings could be maintained at the level of Rs. 52 crores during the current financial year 1978-79. We expect a total quantity of 900 M. T. to be exported during January - March 1979 of which 400 M.T. are expected to be shipped in January itself. The average export price during this period is expected to be around Rs. 198/-per kg. At this rate 900 M.T. will fetch an earning of Rs. 17.82

crores in addition to Rs. 34.28 crores already achieved during the period April-December 1978. Thus in the light of the present indications in exports, we hope to achieve the targetted earnings of about Rs. 52 crores during the current financial year 1978-79.

Conversion Facility at Airports

The Reserve Bank of India has decided to permit travellers proceeding to countries other than Bangladesh, Bhutan and Nepal to convert their unspent rupees into any foreign currency at airports/docks at the time of departure upto Rs. 200/-; the conversion facility for travellers proceeding to Bangladesh is limited to Rs. 100/- This facility will also be available to travellers leaving India by land route at the offices/branches of authorised dealers operating at the land customs stations and money-changers holding the necessary licence from the Reserve Bank of India in this behalf. Hitherto, travellers proceeding outside India were allowed to convert their unspent rupees upto Rs. 60/-, with lower limits applicable for certain categories of travellers like deck-class passengers proceeding to neighbouring countries.

TABLE 4

Months	1978-79 (Current Season)			1977-78 (Last Season)		
	Quantity (kgs.)	Value (Rs.)	Unit Value (Rs./kg)	Quantity (kgs.)	Value (Rs.)	Unit Value (Rs./kg.)
April	214736	36511234	170.03	104273	20667368	198.00
May	175184	29402200	167.84	199617	37229211	186.50
June	91808	16444841	179.12	159114	28157433	176.96
July	77581	15268945	196.81	75672	12780100	168.89
August	37857	6961521	183.89	89619	15791060	176.20
September	63638	12129628	190.60	87012	14120046	162.28
October	238154	51693996	217.06	387627	63825845	164.66
November	239965*	52540702*	218.95	428156	72720291	169.85
December	565902*	121888586*	215.39*	545991	97721977	178.98
Total	1704825	342841653	201.10	2077081	363013331	174.77

NOTE: * Customs Reports
SOURCE: Reports received from the exporters of cardamom.

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वाणिज्य, नागरिक पूर्ति एवं सहकारिता,

भारत

Private Secretary
Minister of State
Commerce, Civil Supplies & Cooperation
INDIA

New Delhi-110001 Dec. 29, 78.

Dear Shri Sundaram,

I am enclosing a copy of the letter
from Private Secretary to Prime Minister,
alongwith original receipt No.99737
dated 16th December, 1978.

With Seasons Greetings,

Yours sincerely,

(S.K. Jain)

Shri S.G. Sundaram,
Chairman,
Cardamom and Rubber Board,
Banerji Road,
COCHIN-682018.

PRIME MINISTER'S NATIONAL RELIEF FUND

Receipt No. 99737

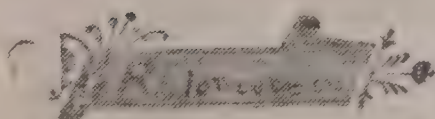
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NEW DELHI

Section Officer

Prime Minister's National Relief Fund

Prime Minister's National Relief Fund

Board Contributes Rs. 20,000 to the Government Hospital

As part of its Labour Welfare measures the Board contributed Rs. 20,000/- to the Government Hospital, Kattappana for the construction of its new wing.

Shri S. G. Sundaram, Chairman, Cardamom Board handed over a cheque for Rs. 20,000/- to Shri V.T. Sebastian M.L.A., President, Hospital Development Committee at a meeting held in the hospital premises.

S/Shri P. Gopalakrishnan Nair, Additional District Magistrate and Thomas Joseph, M.L.A., spoke on the occasion.

Shri K. V. Immanuel proposed vote of thanks.

Foundation Laid for Government Hospital

Shri S. G. Sundaram, Chairman, Cardamom Board laid the foundation stone for the new wing of the Government Hospital, Kattappana.

A large gathering attended the meeting held at the Hospital premises in connection with the foundation laying ceremony.

Library at Madras Office

A reference library has been set up in the Board's Liaison Office at I, Kannaiah Naidu Street, Thyagaraya Nagar, Madras-17. Those who are interested in the cardamom industry may make reference of the library during office hours at the above premises.

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Forest Survey of India Mooted

The establishment of Forest Survey of India for rational forestry planning on a sound data base has been recommended by a working group on forests for the Sixth Plan.

The report of the working group which spells out the forest policy for inclusion in the final plan for 1978-83, has suggested strengthening of the planning infrastructure in the States to help the FSI.

An outlay of Rs. 677 crores has been suggested for the forestry sector in the plan against the revised outlay of Rs. 214 crores in the Fifth plan. The accent is on employment generation in keeping with the overall objectives of the plan.

The report says special emphasis should be laid on linking the forestry programme with the economic development of the tribal population and other weaker sections living in or near the forests in the tribal sub-plan areas.

The objectives of forestry development would include improvement and maintenance of the quality of the environment and wild life protection, increased productivity in forests for meeting economic and industrial needs of the population, extension of tree lands through social forestry and provision of increased employment.

Pointing out the weaknesses in forestry planning in the earlier plans, the report says there was no rationality behind fixing plan target with the result that the achievements in different States

varied widely. As far as total production was concerned there were no up-to-date figures.

The statistical organisation in forestry is very weak, both in States and the Centre. Besides there are hardly any figures regarding employment generated by those programmes. Nor did forestry planning show any special concern for tribals, although the tribal economy and forest development are mutually dependent in most of the tribal areas.

The report emphasises the need for a national conservation strategy to ensure the management of human use of the biosphere, and of the eco-systems and species that comprise it. It would be essential for the Central Government to provide requisite support for conservation of living natural resources, for the protection of their habitat and for wildlife management, research and training. In this connection, it has suggested building up of adequate nature and wildlife conservation organisations at various levels to ensure scientific management of nature reserves.

The policy in the coming years should be to expand the programme of planting quick growing species and long rotation crops to balance the requirement of fuel wood, timber, pulpwood and such industrial raw materials as could be really forecast in the perspective planning. High input forestry with irrigation, fertilizer and improved seeds should be planned to ensure higher productivity.

Social forestry should be undertaken by creating forest raw material resources on degraded forest areas, Government and private-wastelands, panchayat

lands, and lands on the sides of roads, canals and railway lines. The strategy for social forestry should be to select fast growing species not only to meet the needs of fuel-wood and timber of the rural population, but also to promote village level economic activities on a sustained basis.

The farm forestry programme should be taken up as a distinct programme for which forest departments should raise seedling and provide necessary extension support to individuals and institutions.

For supporting the expanded forestry programme, the report has suggested strengthening the existing facilities for research and training of manpower. It would be necessary to establish three more regional State forest service colleges and three more forest rangers colleges. The forest rangers colleges could be located in the western, south western and south eastern regions. The target should be to create facilities for an annual intake of 660 forest rangers. Agricultural universities could also promote forestry degree courses.

Regarding the area under forests at present, the report points out the discrepancy in figures given by the forest departments' statistics and other estimates. They varied from 75 million hectares.

(The Indian Express)

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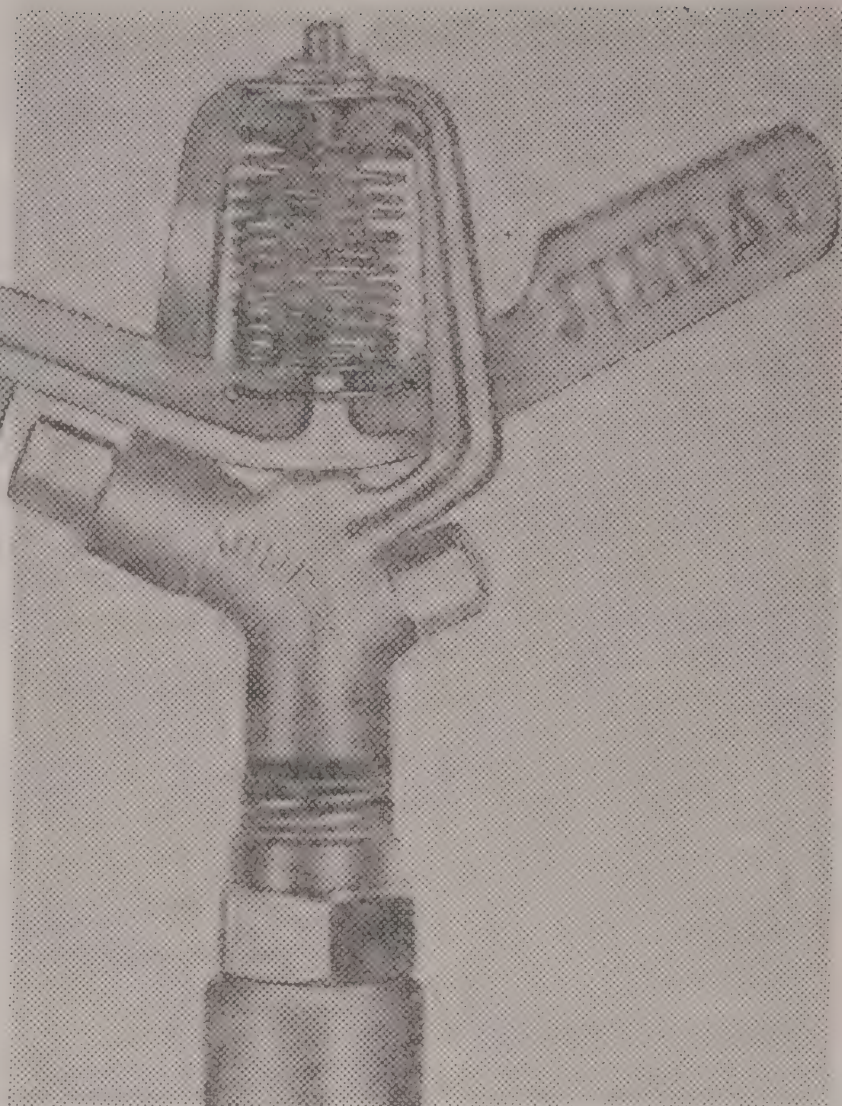
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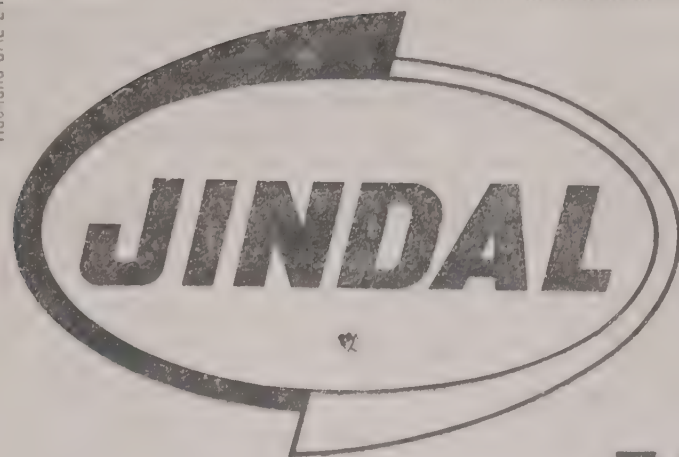
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	South West Monsoon areas (Kerala-Tamilnadu)	North East Monsoon areas (Tamilnadu)	South West Monsoon areas (Karnataka)
Primary Nursery	Routine watering, weeding-earthing up and repair of beds-plant protection measures against pests and diseases.	Routine watering- removing mulch from the germinated beds and erecting shade pandals.	Regular watering, plant protection and weeding.
Secondary Nursery	Third round manring if required - mulching- routine watering and plant protection measures- clearing site, first digging, removing stumps and pebbles for opening next season's secondary nursery.	Routine watering and plant protection measures- Repairing beds and earthing up.	Routine watering, plant protection and weeding. If Mite attack noticed, spray wettable Sulphur at the rate of $\frac{1}{2}$ K in 90 litres water
Starting of New Plantations	Clearing drains and channels continued- Tracing and laying footpaths and roads continued-Line marking and pegging for digging pits.	Works connected with footpaths, roads and drainage channels continued. Third round weeding in last year's new planted areas.	Line marking, pegging and digging pits for planting.
Maintenance of Plantations	Thrips control- collection of fire- wood for cardamom curing-second round of maintenance of footpaths and roads, clearing drainage channels etc continued-Last round harvest continued and completed-tracing, uprooting and destruction of Katte affected plants.	Last round harvest continued- Thrips control - third round weeding and earthing up of plants continued and completed-Collection of firewood.	Watch and Ward-plant protection measures as warranted.

APRIL

Primary Nursery	Routine watering and plant protection measures-weeding-raking of soil in the inter-spaces between rows.	Regular watering and routine maintenance- plant protection measures against pests and diseases.	Routine watering, plant protection and weeding.
Secondary Nursery	Last round weeding-routine watering and plant protection measures- Second digging in the site for the next season's secondary nursery.	Watering and routine upkeep of beds and pandals.	Routine watering, plant protection and weeding.
Starting of New Plantations	Taking pits for planting in the newly cleared area.	Line marking, pegging and digging pits for planting	Opening pits continued Collecting decomposed farm yard manure or compost.
Maintenance of Plantations	Thrips control- collection of firewood for cardamom curing--attending to repair and maintenance of curing house.	Thrips control - collection of firewood	Spraying Bordeaux mixture Mix wettable Sulphur if Mite attack noticed. Opening pits for filling up vacancies.

World Bank President Lauds India's Develop- ment Programmes

The World Bank President Mr. Robert Mc Namara during his recent visit to India held discussions with Union Commerce Minister, Mr Mohan Dharja and Union Finance Minister, Mr. H. M. Patel

On an enquiry by Mr. Mc Namara, about the agricultural research strategy adopted in the country, Dr. M. S. Swaminathan, Director-General, ICAR explained the four-tier research structure beginning with agricultural universities and ending with the operational research projects in the field. He referred to the special emphasis on stepping up productivity through developing disease-free and rust-resistant

varieties and the optimum input requirements. Location specific agricultural research strategy along with post harvest technology, for the twin purpose of achieving security and increasing farmers earnings, was also explained to the World Bank President.

Mr. Mc Namara congratulated the Ministry and the Indian farmers for their impressive performance. He also appreciated the country's efforts at raising internal resources through domestic savings for its development programmes. □

Tea as Milch Cow

The Assam Government is reported to have represented to the Government of India that it should receive a share of the proceeds from the export duty on tea. The State Government

seems to feel that since Assam contributes substantially to the country's total exports, it is entitled to get a portion of the revenue from export duty. In 1977-78, out of the total exports of 220 million kg., about 110 million kg. came from Assam. The Government of India derived nearly Rs. 80 crores from the export duty but Assam did not get anything from this. Assam has also pointed out that if, instead of the export duty, the centre had levied a higher excise duty, the total revenue would have been higher and the state also would have got a share from it. The other tea producing States like west Bengal, Tripura, Kerala and Tamilnadu are also said to be thinking on the lines of Assam.

(Eastern Economist)

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Thrips



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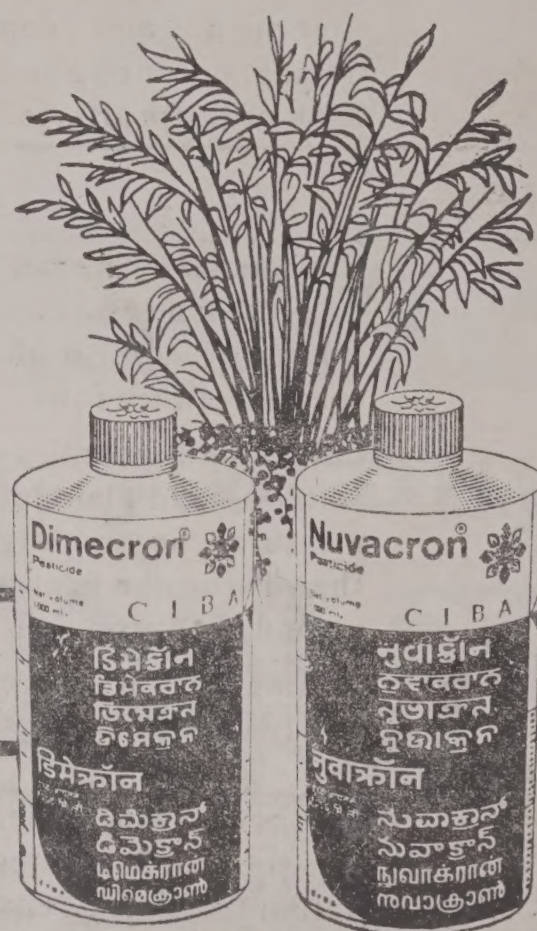
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